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NEUROLOGIC MANIFESTATIONS ASSOCIATED WITH DISSECTING ANEURYSM OF THE AORTA

Chairman's Address

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The historical development of present knowledge concerning dissecting aneurysm of the aorta is a fascinating tale dating back to the sixteenth century. Familiar personages from the pages of history add color to the story. Vesalius,[1] Morgagni,[2] Nicholls,[3] Laennec,[4] Pennock,[5] Peacock,[6] Cruveilhier,[7] Sainet,[8] Swaine and Latham[9] and others have left their lasting imprint on this interesting saga. That the affliction maimed not only the plebeian but the monarch may well have aroused more than passing interest in the early study of the problem. Thus, Nicholls[3] in 1761, reporting before the Royal Society of London on the death of King George II, gave "a minute detail of what occurred on that remarkable and melancholy occasion." Nicholls went on to say, "His Majesty was found fallen on the ground, speechless and motionless. . . . He appeared to have just come from his necessary stool." At necropsy a dissecting aneurysm was demonstrated in the aortic arch.

That the clinical diagnosis of dissecting aneurysm of the aorta was of an elusive nature is given weight by quoting from Peacock,[6] who stated in 1843: "Nor are the symptoms which attend its formation and progress such as can be regarded as characteristic of the affection." If history is correct, the first antemortem diagnosis of dissecting aneurysm of the aorta recorded in literature was made by Swaine and Latham[9] in 1855.

Nearly another century had passed when Shennan,[1] in 1934, in a monumental work painstakingly analyzed the then recorded cases to the number of 300. His scholarly work summarized the known pertinent facts concerning dissecting aneurysms of the aorta. Interestingly enough, as late as 1908, Osler[10] stated that only two cases of dissecting aneurysm of the aorta had been observed at the Johns Hopkins Hospital in the preceding 16 years. Progress, however, was in the making. By 1944 Weisman and Adams,[11] in a review of 38 cases observed in the preceding 10 year period, reported that a correct diagnosis was made in 55 per cent of the cases and in 80 per cent of those in which there were associated neurologic findings. The phenomenal record of correct antemortem diagnosis in 10 of 12 cases as reported by Logue[12] in 1943 is a goal that will be difficult to surpass.

It is not entirely clear to whom the credit belongs for being the first to call attention to the neurologic manifestations associated with dissecting aneurysm of the aorta. In some of the early reported cases in the literature reference is made to signs that undoubtedly indicate involvement of the nervous system. Among such reports are those of Sainet[8] in 1851, Swaine and Latham[9] in 1856 and Coleman[13] in 1898, Swaine and Latham and Coleman observing signs of paraplegia in their patients. In spite of these and other reports, Kalischer[14] in 1914 is credited with being the first to emphasize the importance of neurologic complications associated with dissecting aneurysm of the aorta. It is of interest that Oppenheim, in discussing Kalischer's presentation, stated that he had never observed a similar case.

No longer may we look on dissecting aneurysm of the aorta as a rare affliction. It seems a fair statement to say that about one of every 400 to 500 postmortem examinations reveals such a pathologic process. Males are more frequently affected than females, the ratio being from 2 to 3 males to 1 female. The fifth and sixth decades of life appear to be especially vulnerable, though no decade of life is entirely exempt from the affliction. There may be sudden or rapid death from

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the disease or survival for weeks, months or, in rare instances, years. According to Schnitker and Bayer,[15] the younger age group tends to have a longer duration of the illness. It is generally reported in the literature that 80 per cent of the patients die within a few days and from 80 to 85 per cent succumb within the first two weeks.

TABLE 1.—*General Points of Interest*

Sex	Men: 18; women: 8; total: 26					
Age, yr.	Range: 30 to 72; average: men, 56.4; women, 51.1					
Decade	4th 3	5th 6	6th 10	7th 4	8th 3	
Duration of illness	Sudden, ½ hour or less 8	One hour to several hours 1	Days 1-7 9	Weeks 2-4 4	Months 2-7 2	Years 2-8 2
Etiology	No single cause. Physical strain: 5; emotional strain: 2					
Previous hypertension	16 patients known hypertension; 9 patients presumable hypertension (enlarged heart at necropsy); 1 patient normal blood pressure					

The etiology of the disease, according to the great majority of writers, including Kirkpatrick,[16] Holland and Bayley[17] and others, remains a matter of conjecture. Among the more commonly accepted causes are (1) degenerative changes in the wall of the aorta, (2) congenital defects, (3) mechanical causes, (4) inflammatory reactions and (5) trauma. As stated by Bauersfeld[18] and others, "no single cause can be demonstrated as consistently producing the changes leading to a dissecting aneurysm." According to Schnitker and Bayer,[15] pregnancy appears to play some role in the causation of dissecting aneurysm.

Death in the majority of patients (80 to 90 per cent) is due to an external rupture into one of the body cavities, in order of frequency the pericardial, the thoracic and lastly the abdominal cavity. Ten to 20 per cent of the subjects survive the initial dissection, one half of whom die later from an external rupture. However, as Osler[10] has so well stated, "in a few cases recovery takes place with an illustration of the most remarkable reparative process seen in the human body, the formation of a healed dissecting aneurysm," or, as it is frequently referred to, a "double-barreled aorta."

The diagnosis of dissecting aneurysm of the aorta remains a challenge to the physician. Each patient presents a difficult diagnostic problem, and unless a keen awareness of the symptomatology is entertained, the diagnosis may be overlooked. Under the heading of differential diagnosis, the following conditions come up time and again as important points for consideration: acute cardiac disease, acute cerebral vascular conditions, acute abdominal diseases, acute thoracic or pulmonary diseases, acute affections of the spinal cord such as abscess, hemorrhage, myelitis and finally acute arterial occlusive conditions. It should be kept in mind that occasionally the clinical picture is such that abdominal exploration is carried out because of a mistaken diagnosis. Shennan[1] and Packard and Scott[19] have reported such instances of abdominal exploration.

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The clinical picture common to dissecting aneurysm of the aorta is usually of a catastrophic nature. Morgagni,[2] some 200 years ago, emphasized this point in reporting a case: "A woman, of a fat habit of body, of 50 years of age, of a sober disposition, and naturally rather inclined to sadness and taciturnity; . . . being subject to no disease, . . . having risen early in the morning to her work, . . . cried out, 'Oh!' and spoke not another word, but died instantly." In a few instances the affliction may exist unrecognized during life, coming to light only at necropsy. Most authors, such as Shennan,[1] Schlachman,[20] Gager[21] and others, agree that as a rule the dissection of the aorta is ushered in as an acute dramatic episode in which there is sudden violent pain in the chest, back or abdomen with a feeling of impending death or annihilation. The pains tend to migrate in steplike fashion from one region of the body to another, suggesting the course of progression of the dissection. It may be stated that such pains occurring in a middle-aged person with a history of previous hypertension point the finger of suspicion to the presence of a dissecting aneurysm of the aorta. In contrast to what occurs in coronary disease, pains are not frequently experienced in the arms, but pains and paresthesia are common in the lower limbs.

The remainder of the clinical picture depends on the nature and extent of the dissection. Among the more important physical signs that are of aid in the diagnosis are the maintenance of a previous high blood pressure in the face of a serious vascular disturbance. The leukocyte count is usually elevated in spite of a normal or only slightly altered temperature, except as a terminal event. Examination of the heart may give but little helpful information. The presence of a cardiac murmur and the appearance of a precordial rub during the course of the illness are of diagnostic importance. The electrocardiogram may show evidence of ventricular strain or other changes, which, however, are not of a specific pattern common to dissecting aneurysm of the aorta. Roentgenographic examination of the chest may reveal helpful information and may even establish the diagnosis. Occlusion of an artery to one of the extremities should not be overlooked. Finally, the presence of neurologic signs is important in establishing the diagnosis.

TABLE 2.—*General Medical Findings*

Type of Examination	Cases	Results of Examination
Temperature	14	Usually no elevation of temperature; occasionally high terminal temperature
Leukocyte count	13	Range, 6,800 to 63,000 per cubic millimeter of blood Average, 18,000
Sedimentation rate (Westergren)	9	Range, 17 to 158 mm. in one hour Average, 83
Urine examination	12	Albumin, grade 1 to 4 Occasionally red blood cells and casts
Urea	10	Range, 44 to 400 mg. per 100 cc. of blood Average, 106
Examination of heart	13	7 murmur; 3 no murmur; 3 no comment; 2 transitory rub
Electrocardiogram	13	No specific diagnostic sign
Roentgen examination of chest	16	15 enlarged heart and tortuous aorta; in 4 cases suggested dissecting aneurysm
Examination of fundi	8	6 grade 1 to grade 4 hypertensive changes, 2 with edema; 2 normal
Peripheral vessels	8	2 normal, 1 no pulsation in femoral arteries

20. Schlachman, M.: Dissecting Aortic Aneurysms, New York State J. Med. **49**: 1182-1186 (May 15) 1949.
21. Gager, L. T.: The Symptoms of Dissecting Aneurysm of the Aorta, Ann. Int. Med. **2**: 658-664 (Jan.) 1929.

ANALYSIS OF MATERIAL

Our study consisted in an analysis of data on 26 cases of verified dissecting aneurysm of the aorta taken from the files of the Section on Pathologic Anatomy of the Mayo Clinic for the years 1924 through 1949. Twenty-two of these cases (1924 to 1948) have been previously studied by Kirkpatrick [10] from the general medical standpoint and for the pathologic nature of the aortic lesions.

TABLE 3.—*Diagnosis in 26 Cases of Dissecting Aneurysm of the Aorta*

	Admission Diagnosis	Final Diagnosis Unchanged	Correct or Suspected Diagnosis
Cerebral vascular accident (stroke)	6	5	1
Coronary thrombosis (myocardial infarction)	7	4	3
Acute abdominal disease (gallbladder, mesenteric thrombosis, acute pancreatitis)	6	3	3
Hypertensive encephalopathy (uremia, cardiac failure)	3	2	1
Found dead (no clinical information)	2	2	..
Acute transverse myelitis (dissecting aneurysm of aorta)	1	0	1
Postoperative debility (secondary to cancer of bowel)	1	1	0
	26	17	9*

* In 4 cases a positive diagnosis was made; in 5 cases the diagnosis was strongly suggested.

Table 1 gives the sex, age, duration of the illness, etiologic factors and frequency of hypertension in the 26 patients. No single cause could be determined for the affection. In five patients moderate physical exertion was present at the onset of symptoms, while in two other patients considerable emotional strain was present at the time the symptoms of dissection developed. A history of previous hypertension was noted in 16 cases, the hypertension having existed for at least 10 years in six cases. In only one patient, a woman of 35 years of age with Marfan's syndrome, was it known that hypertension had not previously existed. In another patient (case 4) the history indicated an absence of previous hypertension, but necropsy gave every evidence of long-standing hypertension. In the remaining eight patients there was no information available regarding previous blood pressure readings; however, at necropsy cardiac hypertrophy was present, suggesting a previous hypertension. Table 2 outlines the pertinent physical findings in our cases. In table 3 are recorded the admission and the final diagnosis.

In 25 of the 26 patients the onset of symptoms due to the dissecting aneurysm was sudden. In only one patient was there no history or signs to indicate the time of onset of the dissection. Pain was the most constant and dramatic symptom encountered in the series of cases. Seventeen of the 26 patients experienced acute violent pain as the initial symptom. Of the remaining nine patients, five died so suddenly that no history regarding pain was obtainable. The location of the pain which ushered in the symptoms of the dissection in the 17 patients was as follows: sternal, precordial or anterior thoracic regions, 11 patients; upper abdominal area, 3 patients; upper part of the back, 2 patients, and left shoulder, 1 patient. The initial pain tended to spread over the area of onset and extend or migrate to adjoining areas. In only one instance did we note extension of pain down an arm. Frequently the pain would spread or move from chest to back or from abdomen to back and then down one or both lower limbs. These early pains, while having certain neurologic implications, are probably best considered under the heading of general symptoms. During the course of the dissection, pains of various types may be complained of, but their interpretation as to exact origin is not always an easy matter.

NEUROLOGIC COMPLICATIONS

The neurologic complications associated with dissecting aneurysm of the aorta, as may well be surmised from a knowledge of the underlying pathologic changes, are exceedingly variable and at times difficult of interpretation. Brain, spinal cord or peripheral nerves may be embraced in the pathologic process. From 11 (Shennan [1]) to 29 per cent (Weisman and Adams [11]) of the patients with dissecting aneurysm of the aorta are said to have some neurologic symptoms during the course of the affliction. In our series of cases, 12 patients (46 per cent) showed some evidence of neurologic complication. The remaining 14 patients had to be classed as having no objective neurologic findings. Of these 14 patients, nine died so speedily that no thorough examination was possible, although for four of the nine a history of pain at the onset of symptoms was obtained. In two additional patients the medical aspect of the patients' illness was of such major importance that no neurologic examination had been deemed indicated. These figures do not include terminal coma occurring in four patients who had no objective neurologic findings. Thus, the figure of 46 per cent of patients with evidence of neurologic complication might have been increased if adequate facilities for neurologic study had been available.

In the classification of the neurologic symptoms associated with dissecting aneurysm of the aorta, we attempted to follow that employed by Weisman and Adams [11] of (1) ischemic necrosis of the brain, (2) ischemic necrosis of the spinal cord and (3) ischemic necrosis of the peripheral nerves. This was not a simple matter, for in certain instances, because of the limited neurologic examination, it was difficult to be certain if the presenting symptoms were of cerebral, spinal or peripheral origin. It must also be emphasized that at times neurologic findings occurring during the course of the illness (case 3) were unrelated to the dissection but secondary to the patient's general medical condition. Table 4 classifies the major neurologic complications as they appeared in our 12 patients. In eight patients the neurologic symptoms were primarily of cerebral origin, in three patients of spinal cord origin and in one patient it was difficult to determine if the clinical findings represented cerebral or spinal cord damage. In no case could we demonstrate any objective clinical

TABLE 4.—*Neurologic Findings in 12 Cases**

	Frequency
Cerebral: 8 patients	
Hemiplegia, severe (not due to dissection in 3)	3
Hemiplegia, partial	2
Convulsions (all had other neurologic signs)	4
Periods of unconsciousness (3 with neurologic signs) (confusion, collapse, stupor; no terminal coma)	4
Probably cerebral (vertigo, facial weakness, paresthesia)	2
Spinal cord: 3 patients	
Transverse myelitis	1
Probably spinal cord (weak legs, reflex changes)	2
Cerebral or spinal cord or both: 1 patient (pains, paresthesias of leg, confusion)	1
Patients with multiple neurologic findings	8

* Of the total 26 patients, 17 had pain as the initial symptom.

evidence of involvement of the peripheral nerves. It should be added that eight of the 12 patients had multiple neurologic findings. These figures do not include the terminal comas.

While pain was the usual signal ushering in the train of symptoms, other equally dramatic warnings gave notice of the impending disaster. Thus, the initial symptom or symptoms were pain and unconsciousness in two patients, pain and convulsions in three patients, hemiplegia in two patients and vertigo in one patient.

As noted in table 4, the major number of neurologic complications were of cerebral origin. Five patients had definite signs of hemiplegia. Three of these had marked weakness of the affected side (unrelated to the dissection in two), and two had moderate weakness of the palsied side. In three of the five patients the weakness involved the left side and in one the right side, and in one the side affected was not recorded. Hemiplegia may occur as an initial symptom, or it may develop during the course of the illness. It is well to bear in mind that not every hemiplegia occurring during the course of the illness need be due directly to the dissection but that hemiplegia may result from other unrelated factors.

REPORT OF ILLUSTRATIVE CASES

Case 1 illustrates one of the commoner types of clinical histories of a dissecting aneurysm of the aorta.

CASE 1.—The patient was a man who had been in good health up to 46 years of age, at which time hypertension was first noted. On May 3 of his fifty-second year he awakened at 6:15 a. m. with a severe, sharp pain in his back which extended around over his abdomen. Thirty minutes after the onset of pain he noted numbness and tingling in his left leg. Tenesmus developed, and he began passing large amounts of flatus, with liquid projectile bowel movement. His blood pressure was 290 mm. of mercury systolic and 140 diastolic. He was given a hypodermic injection of ¼ grain (0.016 Gm.) of morphine sulfate, which did not relieve the pain. At 8:45 a. m. he attempted to go to the bathroom but had to be carried back to bed as he collapsed, became cyanotic and ceased to breathe.

At necropsy the pericardial sac was distended by 750 cc. of blood. This blood came from an adventitial tear of the intrapericardial portion of the ascending aorta which communicated with a dissecting aneurysm. The internal tear to the dissecting aneurysm was at the origin of the left subclavian artery. The dissection extended along the inferior surface of the arch of the aorta to the tear in the pericardium but did not involve the other major branches in the neck. It also extended distally along the posterior surface of the aorta, into each iliac artery. In the course of the dissection the left subclavian artery was partially compressed at its origin, and all the intercostal and lumbar arteries were torn.

The brain and the spinal cord appeared essentially normal on gross examination. Histologic examination of the brain revealed marked arteriolosclerosis. Sections of the medulla and of the cervical portion of the spinal cord showed, in addition, congestion of the vessels. In the midthoracic region there were multiple perivascular hemorrhages in both the gray and the white matter. In the lumbar and sacral portions of the spinal cord similar but fewer hemorrhages were present.

Convulsions, loss of consciousness and periods of confusion are fairly frequent manifestations of cerebral involvement. Such symptoms may or may not be associated with objective neurologic findings. Case 2 is an example of a patient having convulsions and objective neurologic findings. This case also demonstrates the importance of obtaining roentgenograms of the chest to visualize abnormal changes in the aorta.

CASE 2.—The patient, a man 39 years of age, was seized with a sudden severe interscapular pain followed at once by nausea and vomiting. The pain "shot" through his entire chest, lasting a few moments but followed by a persistent ache. The following evening he had another episode of severe pain in his chest, which was followed by two generalized convulsive seizures and semistupor which lasted for about one hour. In the succeeding days he continued having some pain in his chest but had more constant and severe pain over his abdomen and the lumbar portion of the spinal column requiring codeine for relief.

The temperature was normal. The blood pressure was 230 mm. of mercury systolic and 168 diastolic. The leukocyte count was 14,100 per cubic millimeter of blood. Albuminuria was graded 3. The blood urea level was 70 mg. per 100 cc. The sedimentation rate was 74 mm. per hour (Westergren). There was no cardiac murmur, but the electrocardiogram showed a ventricular strain pattern. Roentgen examination of the chest demonstrated an aneurysmal dilatation of the ascending, transverse and descending aorta. The neurologic examination revealed all the deep reflexes in the lower limbs to be decreased and bilateral Babinski reflexes to be present. There was generalized weakness but no paralysis.

The pains gradually lessened. On the evening of the fifteenth day the patient suddenly became apprehensive, dyspnea developed, and he sank into unconsciousness and died in a few minutes.

At necropsy, a dissecting aneurysm was observed to extend from the left common carotid artery to the left iliac artery. The left common carotid artery was compressed at its origin, while the left subclavian artery was narrowed and dissected. All the thoracic and upper abdominal intercostal arteries were torn. The lower abdominal intercostal arteries were intact. The dissecting aneurysm reruptured into the left common iliac artery. There was an external tear into the left pleural cavity, which contained 1,500 cc. of blood. The cerebral convolutions were moderately flattened. On coronal section of the brain the surfaces were unusually moist.

Histologic examination revealed a diffuse sclerosis of the cerebral arterioles, with pyknosis of many nerve cells and with swelling of the oligodendroglia and loosening of the ground substance in the adjacent white matter. In the pons and medulla there were numerous irregularly distributed arterioles containing thrombi with greater and lesser perivascular areas of hemorrhage and infarction. Sections of the spinal cord were essentially normal.

As we have mentioned, not all neurologic symptoms developing during the course of illness in cases of dissecting aneurysm of the aorta need result directly from the dissection. Case 3 is an example of a hemiplegia occurring during such an illness as an unrelated symptom.

CASE 3.—The patient, a man 60 years of age, was known to have had hypertension for eight years. Three years before his admission to the clinic he had had what was thought to be partial occlusion of the right posterior-inferior cerebellar artery. At the time roentgenographic examination of the chest had revealed a tortuous aorta with slight calcification.

At 60 years of age, while mixing cement, he was seized with sudden severe pain in his abdomen which extended to his back. Lying down was painful, but he obtained some relief by being up and walking. Systolic blood pressure was 260 and diastolic 140 mm. of mercury. The leukocyte count was 16,000 per cubic millimeter of blood. The electrocardiogram indicated left ventricular strain. A tentative diagnosis of coronary occlusion was made, though the possibility of mesenteric thrombosis was entertained. In about 48 hours the pain subsided. Twenty-three days after the initial pain he arose, ate breakfast and lay down on his bed. An hour later his wife found him with complete flaccid paralysis of the left side. He was confused, gradually sank into a coma and died within 12 hours.

At necropsy there was a dissecting aneurysm extending from the junction of the arch and thoracic aorta to the first portion of the left iliac artery. The major vessels of the arch were not involved in the dissection. The proximal rupture was at the junction of the upper and middle thirds of the thoracic aorta, with a reentrance tear through the left iliac artery. The dissection tore the left intercostal arteries and some of the upper lumbar arteries. Examination of the brain showed the right hemisphere to be swollen and on section to contain a large

hemorrhage in the right external capsule which had ruptured into the right lateral ventricle. The spinal cord was not examined.

It was rather surprising, after viewing the pathologic specimen of a dissecting aneurysm of the aorta with the torn intercostal and lumbar vessels, to find that there were so few complications involving the spinal cord. Three of our patients exhibited symptoms that we ascribed to damage to the spinal cord. Such neurologic findings consisted in weakness of one or both legs, paresthesias, pains and reflex changes. Case 4 is an example of irreparable damage to the spinal cord; Weisman and Adams [11] and more recently Scott and Sancetta [22] have described similar cases.

CASE 4.—The patient was a man 59 years of age. On Oct. 27, 1948, on arising in the morning he had a sudden, severe, sharp pain in the upper part of the sternum that took his breath away. He got up to get a drink of water but returned to bed, since the pain became severer. It extended down the sternum and then through to the back. It was excruciating, and the patient became dyspneic. In about ten minutes the pain lessened, and it was then noted that his legs were rapidly becoming numb and weak, the numbness spreading upward to the level of the umbilicus. During the following days the pain in the chest and back recurred off and on in milder degree but required morphine sulfate for relief.

On the third day the patient was admitted to the hospital. Neurologic examination revealed flaccid paralysis of the lower limbs. There was a complete loss of sensation to the level of the umbilicus, with absent deep reflexes and absent plantar response. The spinal fluid was normal. Physical examination showed normal temperature, the blood pressure was 100 mm. of mercury systolic and 30 diastolic, the leukocyte count was 13,100 per cubic millimeter of blood and the sedimentation rate was 70 mm. per hour (Westergren). Roentgenographic examination of the chest showed a tortuous aorta, with cardiac enlargement. An aortic systolic murmur was present with a transitory pericardial rub. The electrocardiogram showed some evidence of ventricular strain but was not diagnostic.

The patient's pain subsided entirely during the following four days. He was dismissed from the hospital on Nov. 19, 1948, with no change in the neurologic condition. A diagnosis of dissecting aneurysm of the aorta was made. During the following months he had recurring infections of the bladder and increasing decubital ulcers. He died on May 10, 1949, six and one-half months after the initial symptoms.

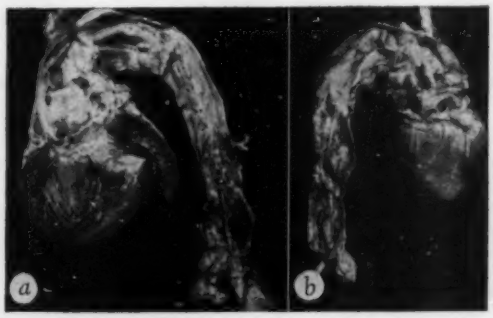

Fig. 1 (case 4).—The aortic luminal side (*a*) and the dissecting aneurysm (*b*). Note the opening in the intima in the ascending aorta and the stretched and torn intercostal vessels with wide open lumens.

At necropsy the heart weighed 800 Gm. and was symmetrically enlarged. On the aortic valve were four recent friable vegetations, the largest 1.2 cm. in diameter. The aorta consisted of a tube with a double lumen, the posterior lumen being a dissecting aneurysm extending from the root of the aorta to the iliac arteries (fig. 1). There were four intimal tears of the ascending aorta opening into this aneurysm; two of the tears had vegetations similar to those on the aortic valve. There was a reentrance tear in the left iliac artery. The dissection extended up the subclavian and common carotid arteries on the right. A few right intercostal arteries were stretched across the lumen in the thoracic aorta, but the remaining intercostal and all the lumbar arteries were severed. The openings of these vessels were patent, however.

Fig. 2 (case 4).—Weigert-stained sections of the spinal cord showing the degeneration of the ascending tract in the cervical and upper thoracic regions, beginning degeneration of the gray matter in the midthoracic and extensive loss of gray matter in the low thoracic, lumbar and sacral portions of the spinal cord, with partial preservation of the posterior tracts.

The brain revealed an old infarct in the right superior lobe of the cerebellum. The spinal cord had a normal, firm consistency to approximately the level of the seventh thoracic vertebra. Distally it was shrunken and soft, without the normal lumbar enlargement. On section of the cervical and upper thoracic segments, the posterior columns were white and glistening. The midthoracic segment of the cord was softer, particularly the central gray matter, while in the lower thoracic, lumbar and sacral regions the gray matter was replaced by an irregular honeycombed yellowish cavity.

Histologic examination of the spinal cord (fig. 2) showed that in the cervical region the normal architecture was preserved. There were, however, a considerable decrease in the size of the fasciculus gracilis and a loose appearance of the dorsal and ventral spinocerebellar and spinothalamic tracts, with loss of myelin. Sections of the upper thoracic region were similar, but the loss of myelin was more marked. In the midthoracic region the intramedullary blood vessels were patent. The degeneration of the ascending tract was more pronounced. In the gray matter the neurons of the posterior portion of the anterior horns were missing. In sections at the lower thoracic, lumbar and sacral regions there was a complete loss of the normal central gray matter, and all the nerve cells were missing. The normal tissue was replaced by a fine lattice work of glial fibers with a few swollen astrocytes and many fat-laden macrophages in the meshes. The intramedullary blood vessels remained patent. There was loss of myelin in the ascending tracts, with preservation of myelin in the descending tracts. The axis cylinders were frequently fragmented and swollen. The anterior roots were demyelinated, while the posterior roots maintained the myelin.[22a]

Other striking neurologic conditions, such as aphasia, blindness and changes in the sympathetic nervous system, have been described as occurring in association with dissecting aneurysm of the aorta. As a rule such changes may readily be explained when viewed with the pathologic findings in mind.

CLINICAL AND PATHOLOGIC CORRELATION

There were available for this study the dissected aortas in the 26 cases. In addition we had the brains in 12, the spinal cords in nine and portions of the sciatic nerves in nine cases. The aortas were studied to deter-

22. Scott, R. W., and Sancetta, S. M.: Dissecting Aneurysm of Aorta With Hemorrhagic Infarction of the Spinal Cord and Complete Paraplegia, Am. Heart J. **38**: 747-756 (Nov.) 1949.

22a. Through the courtesy of Dr. W. E. Youland, pathologist, Cherokee State Hospital, Cherokee, Iowa, we have learned that the brother of this patient also died of a ruptured dissecting aneurysm of the aorta.

mine the location and extent of the dissection and to correlate the involvement of the aortic branches with possible interference with the vascular supply of the central and peripheral nervous systems. To appreciate this correlation, an appraisal of the blood supply of the brain and of the spinal cord may be reviewed.

The blood supply of the brain comes from two sources: the internal carotid arteries and the vertebral arteries. The spinal cord receives a more complicated blood supply. The anterior spinal artery, which supplies the major portion of the cord, is formed from the paired vessels from the vertebral arteries and the eight or nine irregularly distributed radicular arteries which are derived from the paired intercostal arteries. The parallel posterior spinal arteries, also branches of radicular arteries, supply only the superficial dorsal portion of the cord and have only very fine anastomoses with the anterior spinal arteries. These radicular branches as

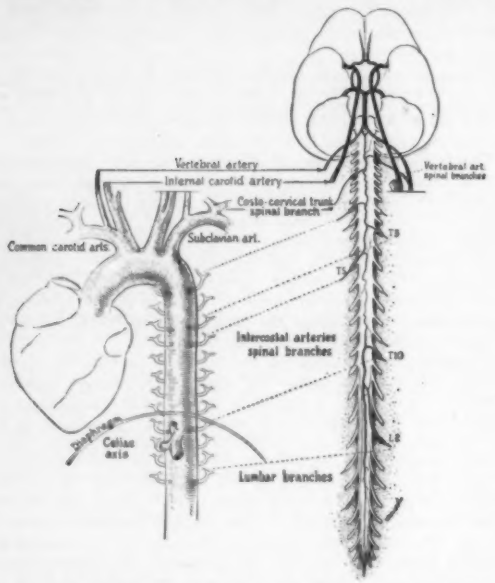

Fig. 3.—Schematic drawing of blood supply to the central nervous system, showing the relationship of the major branches of the aorta to the terminal branches supplying the brain and the spinal cord. (Redrawn in part from Suh and Alexander, *Arch. Neurol. & Psychiat.* **41**: 659-677 [April] 1939 [by permission]).

described by Suh and Alexander [23] are depicted in figure 3. The anterior spinal artery in the midthoracic region becomes markedly attenuated. The major blood supply of the spinal cord below this region comes from a large lower thoracic or upper lumbar vessel, named by Adamkiewicz [24] the arteria radicalis anterior magna. Experimentally, Suh and Alexander were unable to fill the vessels of the lower end of the spinal cord by injecting opaque material into the upper portion of the spinal artery above the attenuated area in the midthoracic region, although the reverse was possible. As shown in figure 3, interference with the blood supply in branches of the aorta, such as could occur with dissecting aneurysm, might well be responsible for pathologic changes in the nervous system normally supplied by such vessels.

23. Suh, T. H., and Alexander, L.: Vascular System of Human Spinal Cord, Arch. Neurol. & Psychiat. **41**: 659-677 (April) 1939.
24. Adamkiewicz, A., cited by Suh and Alexander.[23]

Of the 12 cases in which the brain was examined, six showed that the dissection involved the major vessels of the aortic arch, while in the other six cases no such involvement was evident. In both groups of cases the clinical and pathologic findings did not parallel one another. Thus, in some instances in spite of considerable dissection of the vessels of the aortic arch no

TABLE 5.—*Relationship of Dissection of Vessels of Aortic Arch to Cerebral Lesions and Neurologic Symptoms*

Vessels Affected	Cerebral Lesions	Neurologic Symptoms
All	None	Convulsions 3 days before death
All	Infarct of right basal ganglion	Left hemiparesis for 3 days
All	Old infarct of cerebellum	None
Left subclavian and left carotid	Multiple small infarcts of pons	Convulsions; positive Babinski sign
Left subclavian	Early thrombus of right middle cerebral artery	None; death in 3 hours
Innominate	None	Sudden death

TABLE 6.—*Relationship of Dissection of Vessels of Aortic Arch to Cerebral Lesions and Neurologic Symptoms*

Vessels Affected	Cerebral Lesions	Neurologic Symptoms
None	Massive cerebral hemorrhage	12 hours before death left hemiplegia
None	Massive cerebral hemorrhage	Sudden death at time of dissection
None	Cerebral atrophy and old infarcts	Recent dissection; patient found dead in bed
None	Old infarcts of internal capsule	Onset of dissection 3 years ago; 7 months ago "stroke"; 7 weeks ago right hemiplegia
None	Old infarcts of internal capsule and pons	Died suddenly at home
None	Cerebral edema	Convulsion

TABLE 7.—*Relationship of Dissection of Vessels of Aortic Arch and Intercostal Vessels to Lesions of Spinal Cord and Neurologic Symptoms*

Vessels of Arch	Intercostal Vessels: Thoracic	Intercostal Vessels: Lumbar	Lesions of Spinal Cord	Neurologic Symptoms
All	All	All	Infarction of lower part of cord	Paraplegia
Left subclavian	All	All	Multiple perivascular hemorrhages	Numbness and tingling of legs; death in 3 hours
None	All	All	None; arteriolosclerosis	None
Left subclavian	All	Upper	None; arteriolosclerosis	Positive Babinski sign (infarcts of pons)
None	Lower	All	None	None
None	Upper	All	None	None
None	None	Upper	Acute infarct around sclerosed vessels	None
None	None	Upper	None; arteriolosclerosis	Weakness of legs
Innominate	None	None	None	None; sudden death

clinical findings were present. On the other hand, in some cases clinical signs of cerebral damage occurred without evidence of dissection of the vessels of the aortic arch being present (tables 5 and 6). In the 14 cases in which the brain was not examined the clinical symptoms had no constant relationship to the state of the vessels of the aortic arch. It should be remembered, however, that the dissection along a vessel does not necessarily imply obliteration of the lumen of that vessel. Furthermore, because of the double cerebral blood supply of the basilar artery and of the circle of

Willis, interference with one or more vessels at the aortic arch might not produce cerebral lesions, except in the presence of unusual irregularities or inequalities in the circle of Willis. Finally, because of the associated hypertension, cerebral damage may antedate the dissection or occur independently of it.

In nine cases the spinal cord was examined (table 7). In two cases there were lesions due to interference with the blood supply by dissection of the majority of the intercostal arteries. The most notable changes of the spinal cord occurred in case 4. The other patient with dissection of all the intercostal vessels lived but a few hours, during which time he complained of numbness and tingling in the legs. The spinal cord showed multiple small perivascular hemorrhages. In the remaining seven patients, in whom considerable dissection of the intercostal vessels had occurred, the spinal cord revealed some evidence of arteriosclerosis but no lesions that could be attributed to interference with the blood supply resulting from the dissection; however, one of these patients had some objective evidence of damage of the spinal cord.

In 17 cases the spinal cord was not available for study. In six of these most of the intercostal vessels were torn, while in six many of these vessels were dissected. In all the 12 cases there were no major clinical signs of damage of the spinal cord. The remaining five cases demonstrated no dissection of the intercostal arteries and no objective clinical findings.

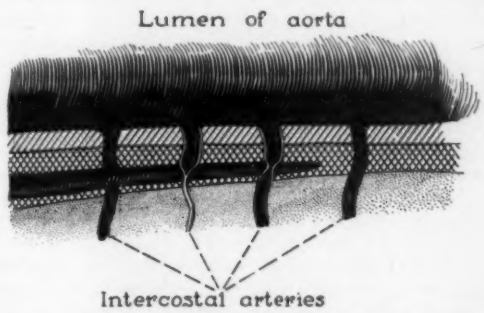

Fig. 4.—Schematic drawing of the mechanism of spinal ischemia in dissecting aneurysm. The dissecting blood, as it extends along the media, stretches the intercostal arteries, first narrowing them and then causing complete occlusion. Further stretching leads to rupture of the vessel with reopening of the lumen, which now receives its blood supply, at least in part, from the secondary lumen.

The discrepancy between the extensive tearing of the intercostal vessels and the absence of both neurologic and pathologic findings can best be explained on the basis of the mechanical effects of the dissection on the intercostal vessels (fig. 4). Gross and Hufnagel,[25] in their experimental work on coarctation of the aorta, found that in dogs obstruction of the aorta at the arch for 10 to 50 minutes might produce spinal paralysis. It would, therefore, seem that, in man, if the intercostal arteries are stretched for a sufficient length of time before their rupture and the reestablishment of circulation, degenerative changes in the spinal cord might be expected. Another factor requiring consideration is the degree of arteriosclerosis of the affected intercostal vessels. Arteriosclerosis might modify the blood supply to the spinal cord prior to the dissection. It might shorten the time between the stretching and rupture of vessels, and finally it might help to prevent the collapse of the affected vessels.

Proximal portions of the sciatic nerves in nine cases appeared to be essentially normal. This does not rule out degeneration in the distal portions of the nerves, which were not available for study.

COMMENT

From an analysis of our material, certain points may be emphasized. Dissecting aneurysm of the aorta is probably of more frequent occurrence than is usually supposed. The symptoms are fairly characteristic. While much progress has been made in the antemortem diagnosis, the disease remains an elusive one. Frequently the patients are seen in emergency and in circumstances in which an accurate history is difficult to obtain, and the examination may not be satisfactory because of the critical state of the subject. Then, too, in the differential diagnosis so many serious conditions more commonly encountered in routine medical practice have to be included for consideration that the possibility of a dissecting aneurysm of the aorta may be overlooked.

The neurologic complications tend to follow definite patterns of cerebral, spinal cord or peripheral nerve origin. Frequently the neurologic symptoms may be diffuse, involving all portions of the nervous system. In our series of cases 46 per cent of the patients gave evidence of neurologic complication. Involvement of the peripheral nerves was essentially negligible, though it must be pointed out that in our study only portions of the sciatic nerves were available for examination. From the clinical standpoint, one certainly gains the impression that many of the pains suffered by these victims might well be due to implication of the peripheral nerves.

The cerebral manifestations are exceedingly variable and can usually be explained on an anatomicopathologic basis. In instances in which the cerebral symptoms cannot be thus explained, they may be due to sudden changes in cerebral blood flow secondary to altered blood pressure resulting from shock and not to any mechanical obstruction in the vessels arising from the aortic arch. There does appear to be a reasonable explanation for the apparent serious disturbance of the vascular supply to the spinal cord.

The correct diagnosis of dissecting aneurysm of the aorta will depend on the physician's understanding of the underlying pathologic process and his awareness of the ensuing symptoms. From a review of our material, we found that the more important points to be considered in establishing a correct diagnosis are in accord with those outlined by Willius and Cragg,[26] and by Glendy, Castleman and White,[27] as follows: (1) the sudden onset of symptoms, with prostration or collapse; (2) the presence of severe and usually prolonged and migrating pains; (3) the presence of hypertension; (4) the presence of neurologic symptoms; (5) normal to only slightly elevated temperature; (6) an enlarged heart with a cardiac murmur and transitory pericardial rub; (7) an electrocardiogram that is not diagnostic; (8) roentgenographic findings of enlarged heart with tortuous aorta which may be dilated and calcified; (9) increased leukocyte count, and (10) albumin in the urine, at times red blood cells.

25. Gross, R. E., and Hufnagel, C. A.: Coarctation of Aorta; Experimental Studies Regarding Its Surgical Correction, New England J. Med. **233**: 287-293 (Sept. 6) 1945.

26. Willius, F. A., and Cragg, R. W.: A Talk on Dissecting Aneurysm of the Aorta, Proc. Staff Meet., Mayo Clin. **16**: 41-44 (Jan. 15) 1941.

27. Glendy, R. E.; Castleman, B., and White, P. D.: Dissecting Aneurysm of the Aorta: A Clinical and Anatomical Analysis of Nineteen Cases (Thirteen Acute) with Notes on the Differential Diagnosis, Am. Heart J. **13**: 129-162 (Feb.) 1937.

CONCLUSIONS

Dissecting aneurysm of the aorta is not so uncommon as is usually supposed. Up to the present time no single cause has been demonstrated as a basis for the affliction. As a result of an increasing awareness of the condition, the antemortem diagnosis is made more frequently and especially so if neurologic symptoms are present. In our series of cases, 46 per cent had some neurologic complications. Cerebral symptoms predominated, but dramatic spinal cord symptoms did occur. Most of the neurologic involvement could be explained on the basis of interference with the blood supply to the brain and the spinal cord. At times the symptoms were due to causes associated with the dissection but not directly related to it.

MASSIVE SEPARATION OF THE RETINA IN FULL TERM INFANTS AND JUVENILES

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Boston

The diagnosis and classification of massive separation of the retina in infants and juveniles is a difficult clinical problem. The vitreal and postlental mass is usually considered to be of inflammatory or neoplastic origin. Depending on the considered etiological basis the condition is referred to as pseudoglioma, retinitis exudativa (Coats's disease) or malignant growth. When premature birth is part of a child's history, the retinopathy of prematurity (Terry's retrolental fibroplasia) is considered. In a study of the last-mentioned disease reported before the Section on Ophthalmology in 1949 examples were encountered of massive separation of the retina occurring in full term infants and juveniles.[1] It is this material augmented by other examples in the collection of the Eye Pathology Laboratory which is used in this report to round out a study of infant and juvenile retinal disease.

The literature of ophthalmology is confusing on the subject of massive retinal separation. References appear under various labels, such as exudative, hemorrhagic or massive retinitis, pseudoglioma, retrolental fibroplasia, Coats's disease and massive gliosis. Collins,[2] as early as 1892, reported that pseudogliomas were due to a fibrosis in the postlental area, choroidal tubercle or inflammation of the uvea and vitreous effusion. Coats's[3] paper, definitive for his time (1908), was entitled "Forms of Retinal Diseases with Massive Exudation." He classified the pathological features of his material into three groups: as an exudation (1) without exaggerated vascular disease; (2) with pronounced vascular changes, and (3) with arterial vascular communication. In a further report (1912)[4] his title was "On Retinitis Exudativa"—sometimes referred to as retinitis hemorrhagica externa. In this paper he separately designated the arteriovenous communication group as an angiomatosis of the retina. Coats's clinical observations may be summarized as follows: the patient, usually a male, of normal general health and family history showed unilaterally a whitish, yellowish exudation in the retina, accompanied with a hemorrhage and structural vascular anomalies. The process was noted to advance gradually and painlessly to complete separation of the retina. From his studies Coats reported exudation of serum and hemorrhage within and outside of the retina, and numerous macrophages accompanied with fibrosis in and between the retina and in the choroid. All these changes were described as exaggerated in late stages. Coats considered that a number of causes could produce the retinal separation.

Leber[5] in 1915 considered these pathological processes to be inflammatory and to show foci of necrosis. He ascribed the origin of a considerable number of macrophages to proliferations of the pigment layer of the retina. He thought that the retinal separation was due to serofibrinous exudation. In the late stages he noted encapsulation by fibrous tissue. Schieck[6] (1930) in Kurze's Handbuch listed published reports and describes similar stages of the pathological process. Lamb[7] in a valuable report (1938) on exudative retinitis described both early and late microscopic lesions. He found primary extensive albuminous edema in whole or part of all layers of the retina—a diffuse process. Some of his patients showed perivasculitis and macrophages, which he thought indicated inflammation. Connective tissue was noted on the inner surface of the retina. He also considered the process to be a retinitis and thought that the retinal pigment epithelium was an important factor in the secondary changes.

Marshall and Michaelson[8] (1933) reported a series with emphasis on eight characteristics: (1) youth of the patient; (2) late stage of the process when seen clinically; (3) chief pathological changes in outer layers of the retina; (4) numerous large bladder cells; (5) relatively insignificant hemorrhage; (6) lack of subretinal membrane; (7) normal pigment layer of the retina, and (8) normal choroid. They considered their cases similar to Leber's retinitis exudativa serofibrinosa. Reese[9] (1936) described three interesting cases of massive retinal fibrosis and gave some thought toward considering this reaction as an entity. Elwyn[10] (1940) described his conception of retinitis exudativa as primarily a vascular malformation with secondary changes due to transudations and hemorrhages.

If I use the loose descriptions of what constitutes these retinopathies, this communication could be said to be a report of 100 cases of pseudoglioma and 22 cases of Coats's disease. Neither term is satisfactory. However, I believe from a study of this material that it is possible to classify massive separation of the retina in infants and juveniles on the basis of a close relationship to a principal cause. Granted that a similar ocular

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Read before the Section on Ophthalmology at the Ninety-Ninth Annual Session of the American Medical Association, San Francisco, June 30, 1950.
This article has been abbreviated in THE JOURNAL by omission of a portion of the illustrations. The complete article will appear in the author's reprints.
The referral of patients by Drs. Trygve Gundersen, Sidney Farber, Joseph Ginsberg, Hugo B. C. Riemer and Benjamin Sachs aided me in the preparation of this article.

1. Heath, P.: Retrolental Fibroplasia as a Syndrome, Arch. Ophth. **44**: 245 (Aug.) 1950.
2. Collins, E. T.: Pseudo-Glioma, Roy. London Ophth. Hosp. Rep. **13**: 361-394, 1890-1892.
3. Coats, G.: Forms of Retinal Disease with Massive Exudation, Roy. London Ophth. Hosp. Rep. **17**: 440-525, 1907-1908.
4. Coats, G.: Über Retinitis exudativa (Retinitis haemorrhagica externa), Arch. f. Ophth. **81**: 275-329, 1912.
5. Leber, T.: Die Retinitis exsudativa (Coats) Retinitis und Chorioretinitis serofibrinosa degenerans, in Graefe, A.; Saemisch, T., and Hess, C.: Handbuch der gesamten Augenheilkunde, Leipzig, W. Engleman, 1915, vol. 17, pt. 2, pp. 126-127.
6. Schieck, F.: Die Retinitis exudativa (George Coats), in Schieck, F., and others: Kurzes Handbuch der Ophthalmologie, Berlin, Julius Springer, 1930.
7. Lamb, H. D.: Exudative Retinitis, Am. J. Ophth. **21**: 618-641 (June) 1938.
8. Marshall, J., and Michaelson, I. C.: Exudative Retinitis in Childhood, Tr. Ophth. Soc. U. Kingdom **53**: 102-118, 1933.
9. Reese, A. B.: Massive Retinal Fibrosis in Children, Am. J. Ophth. **19**: 576-582 (July) 1936.
10. Elwyn, H.: The Place of Coats's Disease Among the Diseases of the Retina, Arch. Ophth. **23**: 507-521 (March) 1940.

pathological appearance may arise from different agents and that it is often difficult to relate the initial agent to the chief destructive force—nevertheless, a careful study of the early lesions will usually indicate a cause. This is not possible in late stages because then extensive diseases of the retina resemble one another. Trauma

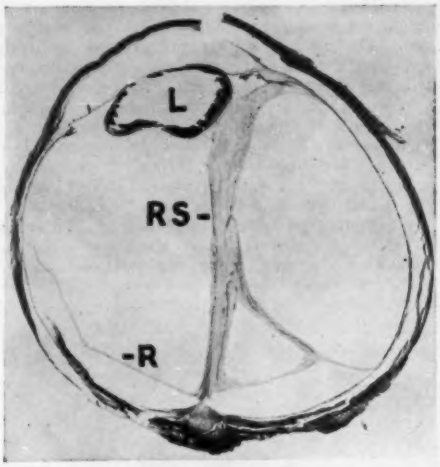

Fig. 1.—Right eye, boy aged 3½ years, illustrates massive separation of the retina, due to its incomplete differentiation, and a deficient secondary vitreous. *L*, the lens, with some posterior cataractous changes, thickened capsule; *RS*, retinal stalk forming retrolental fibrosis behind lens on temporal side, and *R*, incompletely differentiated retina.

is not considered to be a primary retinal disease and is omitted from the following suggested classification, which will be illustrated in part by brief case reports.

Classification of Massive Separation of the Retina in Full Term Infants and Juveniles

GROUP 1.—Retinal Aplasia and Dysplasia: Due to fetal injury at 13 to 65 mm. stage, often accompanied with deficient secondary vitreous.

GROUP 2.—Specific Inflammation: Uveitis and endophthalmitis, arising from diverse agents, from bacterial, mycotic and parasitic infections.

GROUP 3.—Vascular Retinopathy: Disrupting retinal edema or hemorrhage due to pathological permeability that is nonspecific and caused by metabolic disease.

GROUP 4.—Primary Retinal Neoplasm: Neuroectodermal (retinoblastoma), vascular (angiomatosis) and neuroglial (glioma or astrocytoma).

SHORT DESCRIPTIONS AND ILLUSTRATIONS OF THE SEVERAL TYPES OF MASSIVE SEPARATION OF THE RETINA

Group 1, retinal aplasia and dysplasia, is distinguished by congenital ocular maldevelopment, chiefly seen in these rare cases as incompleteness of retinal structure and an insufficient secondary vitreous. The membrane has not enough vitreous support on its inner surface to compel approximation against the choroid; there results loose coaptation, folds, stalks and early congenital massive separation. These patients usually have good general health but others may show dysplasia involving the central nervous system. Clinically, the process is noncongestive, unilateral and painless. Histopathologically the degree of manifestation is closely related to the level of differentiation of the retina. The affected eye is always smaller than its fellow. Some patients show a substantial retinal stalk which includes the hyaloid artery and extends anteriorly from the nerve head. There usually is a retrolental fibrous proliferation induced by the dislocated retina. In addition, the lens is usually cataractous in its posterior cortex and is intimately connected to a membrane which pulls in the ciliary processes. Characteristic findings on the inner surface of the retina are fibrous tags with brushlike terminations. An example of this group (undifferentiated retina) is as follows (figs. 1, 2, 3 and 4):

The right eye of G. W., a boy 3½ years of age, had been smaller than its fellow since birth. Measurements were 18 mm. in the horizontal diameter and 19 mm. in the anterior-posterior. The lens showed postcortical opacification, a thick capsule and a retrolental membrane on its temporal side, drawing in some ciliary processes. A stalk composed of undifferentiated retina and a functioning hyaloid artery extended from the posterior portion of the lens to the nerve head, and a fibrous band extended to the ciliary body from the back of the lens. About one half of the retina had collapsed into an axial position. On the inner surface of the retina were brushlike tufts, abortively contributing to an incompletely formed vitreous. The retina showed a pigment epithelium, partial outer granular layer and incomplete nerve fibrillary layer. The ganglion and nerve fiber layers were not differentiated. The choroid was only partially developed.

Group 2, the largest, represents specific inflammations; it includes the monocular massive separations of the retina from uveitis and endophthalmitis due to demonstrable causes. The pathological processes are suppurative and granulomatous. A careful and prolonged study of the patient and/or the specimen usually reveals one of the many possible causative agents. Meningococcic meningitis in the recent past in this country has been a common cause (about 3 per cent in some epidemics). The Cysticercus parasite in some parts of the world has long been identified as an occasional cause of uveal disease and retinal separation.

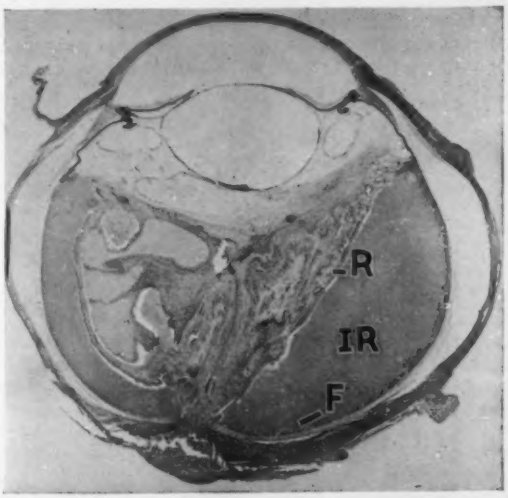

Fig. 5.—Nematode endophthalmitis: *R*, retina shows massive separation and organization and cyst formation and contains worm parasites; *IR*, intraretinal fluid; *F*, fibrosis on pigment layer of retina and choroid.

Of considerable importance, and up to now not emphasized in this country, are the massive separations associated with an endophthalmitis due to mycotic infection and worm parasites. The latter were described by Wilder [11] in a preliminary report at the 1950 Pan-American Congress of Ophthalmology. The parasites (often nematodes) were only found after much search-

11. Wilder, H. C.: Nematodes and Endophthalmitis, to be published.

ing through many sections. It is probable that it will take considerable time to establish the ocular incidence of various parasitic infections in this country. Sections of early lesions more readily show identifiable fungi and worm parasites. In either case the tissue often responds by an increase of eosinophilic cells and sometimes by a

Fig. 11.—Cryptococcus neoformans (Torula) endophthalmitis. There is an extensive necrotizing congenital chorioretinitis with massive separation, part of a general infection, maternal in origin: *V*, protein-rich fibrinous vitreous; *SR*, serum under necrotic retina, and *CR*, chorioretinitis.

sharp increase of multinucleated plasma cells. Numerous histiocytes are usually to be found along the choroidal and retinal borders of the intraretinal fluid and within the retina. Edema is excessive and some hemorrhage is present. In early cases of each infection, various cycles of the parasite are sometimes found in the choroid, vitreous and retina, especially along borders of the intraretinal fluid and in the retrolental region. A pertinent point is that edema and hemorrhage force the retina apart. It usually is not pulled off by secondary vitreous organization. In late stages fibrosis and pathological repair mask evidences of the invasion. The site

Fig. 13.—Massive splitting and separation of the retina; *R*, in an early state, due to hemorrhage.

of the parasite may sometimes be identified by an accumulation of inflammatory cells about a remnant. Contaminants, especially fungi, are liable to be present. It would be ideal to be able to classify pathogens from cultures. The accurate classification of species, especially fungi, depends on cultural characteristics. The pathologist ordinarily does not obtain the specimen in a fresh state, but culture and animal inoculations should be done from suspected material whenever possible. The vectors of these invaders are still to be discovered. The family pet is a likely source of nematodes. The following is an example of massive separation of the retina due to nematoid endophthalmitis:

After a mild attack of measles a child 2½ years of age showed in the right eye a whitish pupillary reflex two months before admission. The iris was muddy and greenish in appearance compared with the unaffected left eye. When the eye was opened in the laboratory, the retina was separated and balled behind the lens. Microscopically the iris showed diffuse infiltration with lymphocytes, plasma cells, some multinucleated, and a few macrophages. Eosinophilia was pronounced. Posterior synechiae were present. A thick fibrous retrolental membrane was associated with the balled retina. Fibrous inflammatory and cystic bands extended into the intraretinal fluid.

The ciliary processes were drawn inward. The retina was attached at the ora serrata, where there was some pigment proliferation and clumping, and at the dragged-in nerve head.

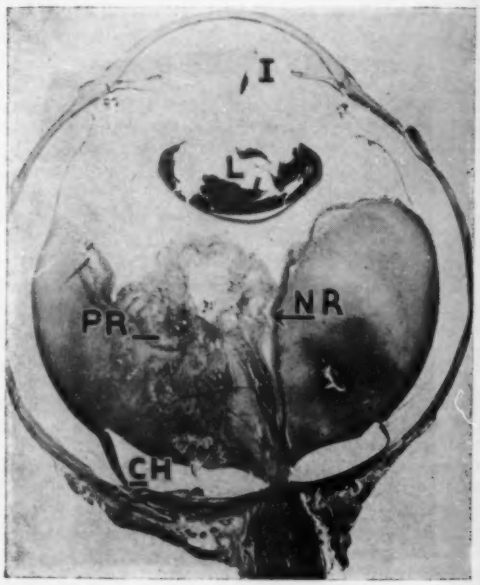

Fig. 25.—Massive separation of retina due to angiomatosis is representative of primary tumor: *I*, iris, anterior synechia; *L*, lens; *NR*, normal leaf of retina separated by protein-rich serum; *PR*, neoplastic proliferating vascular tissue within the retina, and *CH*, choroid artefactually separated from sclera.

It showed pronounced folding and dissociation from edema, numerous collections of histiocytes, cyst formation and gliosis. Heavy focal accumulations of lymphocytes were scattered in the retina and occasionally in the ciliary body. The choroid was edematous. On the pigment epithelial surface of the separated retina were nodules of fibrin representing organization of repair of hemorrhage. Some early atrophic changes were noted in the optic nerve. In sections parasitic worms were found in the anterior vitreous, and some were cut in different planes, and apparently in different cycles, in the retinal fluid and its organizing membrane. The whole process was subacute. Secondary walling off and fibrin were moderately present. The case is illustrated by figures 5 to 10, inclusive.

It is possible for a child to be born full term with a mycotic infection of maternal origin. An example of this is endophthalmia from Torula. Infant toxoplasmosis which also is maternal in origin does not separate the retina, in my experience, because the necrotizing process is focal in both retina and choroid

and fuses these structures.[12] The possibility exists of a combined lesion, and this subject is not closed at this time. The following is an example of bilateral endophthalmitis due to a fungus, maternal in origin, and showing massive separation:

A male infant, about a month premature, at the time of death (27 days) showed a generalized infection from Cryptococcus neoformans; many organs were involved. Culture was positive. Some pathological changes suggested a dual infection of cryptococcosis and toxoplasmosis. Ocular sections showed a diffuse, necrotizing chorioretinitis with pronounced dissociation of tissue elements unlike the typical focal chorioretinitis of toxoplasmosis; the vitreous contained fibrin. The retina showed extensive separation with considerable phagocytosis of retinal pigment. Cryptococcus neoformans organisms were easily found in the retina and brain (figs. 11-14).

Group 3, vascular retinopathy, includes nonspecific vascular disease of the retina manifested by pathological permeability. Separation of the retina is brought about by excessive edema and hemorrhage. A possible variant is characterized by multiple primary retinal cysts; it is so rare and its underlying cause so obscure that its inclusion in group 3 is tentative. These binocular manifestations, whether from edema, hemorrhage or multiple cysts, apparently are spontaneous and unaccompanied with other signs of primary inflammation. Hypothetically, an enzymic alteration of the vitreous would give enough force to cause the retina to split apart. In any event the vitreous is either absorbed elsewhere or is transported into the retina. Within the retinal funnel the remnants of vitreous as seen in sections are quite different in appearance from the intraretinal protein-rich fluid. The latter usually contains a considerable number of lipid storing fatty histiocytes. These, in my opinion, are derived from the reticuloendothelial system and not from the retinal pigment layer. There is little if any disturbance in the retinal pigment layer. This layer may show a few small, late, secondary proliferations. The vascular proliferations which are often present can be identified as secondary. In general, it is possible that definite causes will be found in group 3 from the study of acute or early states. Allergic states and nutritional deficiencies underlie some massive separations in this grouping.

In the dominantly hemorrhagic form of massive separation the retina is split apart, as is usual in massive separation, at the level of the rod and cone layer. The hemorrhagic form resembles the serous type except for the addition of blood and more histiocytes and earlier fibrosis. Fibrosis and its consequences are secondary and follow the separation but do not cause it. Hyalin necrosis and partially encapsuled detritus and zones of old hemorrhage are commonly seen in sections of eyes in subacute stages. The sections of eyes in advanced stages sometimes show pronounced gliosis, at times massive in degree. Usually fibrosis, massive in degree, ties the retina down proportionally, and its elevation is only nodular and focal. The cystoid changes in late cases are of the degenerative type.

There are some hints in the sections that the serous type of lesion is due to an unidentified agent acting locally to provoke the vascular leakage. However, metabolic and indirect causes probably underlie most of the pathological processes of this type. Leber's retinitis exudativa serofibrinosa can be classified here.

An early state of the hemorrhagic type of massive separation of the retina is illustrated in figures 15, 16 and 17. In this case the infant was of at least eight months' gestation, with a birth weight of 4½ pounds (680 Gm.). An extreme degree of disrupting and destroying hemorrhage is illustrated in the retina. The separation is at the rod and cone level, leaving the pigment epithelium with the choroid. The retina is split by extensive hemorrhage, principally at the inner reticular layer; some secondary cystoid spaces are in this zone. The Cloquet canal area is nebulously outlined by a faint fibrillary structure within the vitreous. Eosinophilic granular cells and macrophages are scattered thinly.

The rarest example of massive separation is due to spontaneous multiple bilateral retinal cysts. This condition probably can be classified in group 3, namely, as a massive separation due to some unknown metabolic disease. The cysts appear to be a primary and not a secondary manifestation of degeneration. The cause probably is not local. The process begins, according to sections, just outside the external limiting membrane. The retina is separated at the rod and cone level from the pigment epithelium. There is but little fibrosis in the early stages. The source and force of the disruption apparently is related to the retinal or choroidal blood supply. The ophthalmoscopic findings are unusual, nearly transparent "bubbles" within the retina running anteriorly and posteriorly. It is a bilateral, painless, gradually developing process, which may bear some relationship to the cause of the bone disease as in the case used to illustrate this group. Intraocular pressure is not changed materially. Another distinguishing point is the improvement and maintenance of vision over a considerable period of time after diathermy surface coagulation. Although the underlying cause at the moment is obscure, low level anoxemia over a long

Fig. 32.—Massive gliosis of the retina, a nonspecific reaction, representing repair, usually of hemorrhage, commonly found in late stages of any inflammatory juvenile retinal separation: *GL*, gliosis within the retina; *F*, fibrosis lying over atrophic choroid, *CH*, and *ON*, optic nerve.

12. Heath, P., and Zuelzer, W. W.: Toxoplasmosis: Report of Ocular Findings in Infant Twins, Arch. Ophth. **33**: 184-191 (March) 1942.

period of time could theoretically explain the fairly uniform distribution and size of the retinal cysts. An additional discrimination from an ordinary secondary degenerative cystoid disease is its late and slow development without signs of inflammation. In the following illustrative case of bilateral primary massive cystic separation of the retina, the clear cysts appeared when the patient was about ten years of age.

A child at the age of 1 year showed a disturbance of endochondral ossification, possibly an achondroplasia, which was classified by some as eccento-osteochondrodysplasia (Morquio's disease). He became unable to walk, and at the age of 10 years there developed multiple bilateral semitransparent retinal cysts. There was no history of physical injury. The clinical characteristics were slow onset, maintenance of considerable vision for a period of years, mild vitreous opacities, low grade chronic episcleral and scleral infiltrations, and a late disinsertion of the retina. Sections of one globe showed extensive relatively uniformly severe cystoid degeneration throughout, involving inner and outer nuclear layers as well as the zone between, and the retina detached at its ora serrata insertion.

Clinical Differentiation of Massive Separations

Group	Frequency	Onset Age	Sex	Eye Size	Laterality	Inspection and Ophthalmoscopic Findings
1 Retinal aplasia and dysplasia	Rare	Congenital, either full term or premature	Either	Always small	Unilateral	Partial and extensive separation: asymmetric postlental mass, numerous vessels; retinal stalk; cataract changes
2 Specific inflammation	Rare	Birth to 15 yr.	65% males	Normal; atrophy in late stages	Unilateral; rarely bilateral	Early massive separation; inflammatory vitreous; hemorrhage variable, usually exaggerated
3 Vascular retinopathy	Rare	Birth to 10 yr.	More males	Normal	Unilateral or bilateral	Massive separation; uniformly opaque and gray; vessels partly obscured; variable hemorrhage, may be excessive
4 Neoplasm Retinoblastoma	Rare	1 mo. to 3 yr.	Either	Normal	Often bilateral	Flat, white retinal patches changing to pink elevated masses; vessels loop in and out
Angiomatosis	Rare	10 to 30 yr.	Either	Normal	Unilateral	Quadrant segmental orange-colored mass; varicose dilated vessels, cysts and exudates
Astrocytoma	Very rare	3 to 30 yr.	Either	Normal	Unilateral or bilateral	Patchy white elevations obscuring vessels

The cysts and small spaces were limited by Müller's fibers running perpendicular to the surface of the retina. Some of the cysts contained pink-staining granular material. Few ganglion cells were apparent, although there was less degenerative change than one would expect. Autolytic changes were mild. The inner limiting membrane was thickened. Some glial proliferations were present. The optic nerve was atrophic. These observations are illustrated by figures 18 to 21, inclusive.

Massive separation of the retina due to primary new growth is classifiable from the tissue of origin into three main types. Each shows in sections easily identifiable growth characteristics. Each has some genetic attributes. The retinoblastoma often shows an irregular dominance. The astrocytoma or true glioma is sometimes familial. The vascular growth, angiomatosis, in about a quarter of the cases is familial. The retinoblastoma often is bilateral, the angiomatosis is unilateral, and the excessively rare astrocytoma may be either unilateral or bilateral. The early clinical appearances of the malignant retinoblastoma and the benign astrocytoma are somewhat similar.

The retinoblastoma usually appears in an infant aged between 6 months and 3 years in one eye; it is liable to involve both. It is characterized by rapid growth, considerable necrosis and, sometimes, the presence of calcium. This rapidly growing tumor is exceedingly dependent on a good oxygen supply. The retinoblastoma, unfortunately, is the commonest of the three tumors. Microscopic study of this tumor shows that it may originate from either the inner or outer nuclear layers or both. The tumor often shows rosette and pseudorosette formation and mineralization.

The fibrous astrocytoma is a monocular or bilateral manifestation which is discovered in children between the age of 4 to 6 years or in young adults and is relatively stationary in growth; other siblings may be affected. Its separation of the retina is partial, gradual and, unless multicentric origins exist, not realized until about the age of puberty. It is such a rare tumor that it is unlikely ever to be seen by the average ophthalmologist.[13] The growth is so slow that often months pass before significant changes can be noted clinically. The retinal separation is first meridial and later the process becomes more massive. Sections of the astrocytoma stained for glial fibers show enormous numbers of glial cells and fibers, some with large, rounded nuclei, others more spindle-shaped. The cells are mostly of two sizes, large and small, both possessing numerous fiber processes. A few exceedingly large, ganglion-sized cells with thicker processes are present.

To illustrate astrocytoma (figs. 22-24), a female infant (whose younger sister was similarly affected bilaterally) showed at the age of 1 year a convergent squint of the left eye. Ophthalmoscopic examination at that time showed multiple greenish white patches and some elevations of the retina bilaterally. The right eye in addition had a nodule on the nerve head. Microscopic examination of the right eye revealed a thickened nerve fiber layer in the retina. Near the ora the retina was poorly differentiated. There was some proliferation of the pigment epithelium, and a hyalin pink coagulum was noted within its fibrous structure. The retina was better differentiated toward the nerve head, especially its external nuclear layer, while the inner nuclear layer remained somewhat thin. There was mild endothelial proliferation within the retinal vessels. A few lymphocytes were stranded through the choroid. The retina itself was separated by a pink-staining granular coagulum. The nerve head in association with the retina showed an elevated mass of glial tissue. Glial cells were of three types, small, large and a few extra large, many showing granules and basophilic

13. McLean, J. M.: Astrocytoma (True Glioma) of the Retina, Arch. Ophth. **18**: 255-262 (Aug.) 1937.

staining. Some were decidedly spindle shaped. The large cells were three or more times the size of the smallest and often contained two nucleoli. The nerve fibrillary layer was thickened. Silver stains showed pronounced increase of glial fibers; many were swollen and varicose. Some cystic changes increased toward the ora.

Angiomatosis of the retina (von Hippel's or Lindau's disease) is clinically characterized in early states by elevations of the retina in one vascular quadrant, associated with exudation and hemorrhage. Gradually there are formed decidedly dilated vessels connected by means of a large cyst or multiple cysts and increased exudations. Vasoformative tissue with nodular swellings and proliferations can often be noted with the ophthalmoscope as well as seen in sections. Microscopically, one sees angiomatous structural proliferations and greatly dilated vascular channels within the retina accompanied with extensive edema and hemorrhage in a slowly expanding tumor. The extension of the tumor causes a gradual massive separation of the retina.

of the Retina in Infants and Children

Inflammatory Changes	Intraocular Pressure	Associated Defects and Signs	Progression	Treatment
None	Normal	Common, congenital anomalies in same eye; especially a deficient secondary vitreous	Stationary	None
Congestion; vitreous opacities and retinitis vary with agent	Lowered	Uveitis and endophthalmitis; infections and parasites	Rapid retinal separation	Treat cause; prevent second eye involvement
Mild and in retina	Lowered unless secondary glaucoma from angle block	Pathological permeability; usually unknown and spontaneous causes; endocrine disease	Rapid separation of retina	None known except in the slow onset cystic form
None	Normal	None, dominant inheritance	Rapid growth (weeks)	Enucleation and/or roentgen ray
None early; low grade uveitis; secondary glaucoma from angle block may develop late	Either a late atrophy or secondary glaucoma	Cerebral and cerebellar cysts; sometimes familial	Slowly progressive (months)	Diathermy coagulation
None	Normal	Retina not fully differentiated	Very slow growth (years)	(?) Diathermy coagulation

An example of angiomatosis (figs. 25-31) occurred in a girl 13 years of age, whose mother, now living and well, at the age of 13 years had a similar blind right eye which was enucleated ten years after its discovery. The child's eye had been blind one year. Ophthalmoscopic examination showed in the right eye a large, yellowish white retrolental mass. Many small vessels, some with irregular dilatations in the walls, were seen. There was complete separation of the retina. Examination of the normal-sized enucleated eye showed an anterior vascular membrane of the iris and some anterior adhesions partially blocking the angle. The retina was separated by extensive serum, hemorrhage and dilated neovascular structures; it contained a considerable number of fat-laden histiocytes. The decidedly edematous retina showed an increased thickness of the nerve fibrillary layer, many large and newly formed vessels, and cystic spaces. Nodules of gliosis and fibrosis had formed on the choroid. The vitreous contained excessive fibrin and also was partly organized. Cholesterin clefts were conspicuous in the retina and in the heavily eosin-stained intraretinal fluid. The pigment layer of the retina showed some proliferation and remained with the shrunken choroid.

DIFFERENTIAL DIAGNOSIS

Clinical diagnosis is more difficult to make than diagnosis from sections of pathological tissue. Ophthalmoscopic examinations alone are often inadequate for diagnosis. It is necessary to utilize all available information to arrive at a tentative diagnosis. When the retina is hopelessly compromised and the diagnosis is doubtful, the eye should be removed. This permits a microscopic examination which may save the patient's life or may show means of preventing the involvement of the second eye. A summary of clinical differentiations is presented in the accompanying table.

COMMENT

A study of the classification of massive separation of the retina in full term infants and juveniles will show that congenital developmental anomalies are placed in group 1, that group 2 contains the large field of inflammation from many specific causes, that separations due to little understood or unknown causes repose in group 3 and that group 4 pertains to neoplasms. The common and unifying manifestations in this classification are the point of attack and the consequences, namely, a retinal disease and a massive separation. Acute stages of these retinal diseases are quite different in appearance and easier to classify. Late stages of the retinopathies tend to resemble one another when secondary reparative reaction tends to mask or conceal the primary disease. Late stages of several kinds of retinopathy will show similar fibrosis and gliosis, sometimes massive in degree, as part of the repair from hemorrhage (figs. 32 and 33). Pigment is transported variously and decorates the scar tissue irregularly. But these observations represent changes in degree of pathological repair and should not be confused with specific diseases. A considerable list of merely descriptive terms can be jettisoned by the adoption of the classification based on cause. Additional advances will be reached by further elucidation of causes in the group 3 patients — those with unexplained vascular permeability. Some patients in this group at present classified as possessing an unknown metabolic disease will have some basic causative factor established to explain the vascular permeability; others probably will remain in this group as possessing a metabolic disease identifiable as an endocrine dysfunction. A considerable advance is made, I believe, in establishing a definite framework for classification. In group 2, which is representative of specific inflammations, some agents (like tuberculosis and meningococcic

meningitis) and other metastatic and local septic processes and some parasites have long been recognized. Two newcomers emphasized here are retinal diseases and massive separations due to mycotic and parasitic infections. Endophthalmitis due to a fungus can occur in infants, juveniles and adults, and it can also be a congenital disease maternal in origin. The parasitic worms are more liable to be acquired during juvenile life. But parasites can be acquired by the premature after birth and may cause massive separation.

A third and apparently new and rare type of massive bilateral separation which originates from multiple retinal cysts is described herein. A fourth exceedingly rare cause is the benign growth, astrocytoma, which can occur in young juveniles and siblings. It is probable that these relatively slow growths may be discovered in adult life, although the first manifestation was not recognized in juvenile life. The frequency of the various causes of massive primary retinal separations will only be established after extended study.

CONCLUSIONS

Massive separation of the retina in infants and juveniles is caused by many factors and agents. The incidence of each etiological factor remains to be determined. A sufficient number of these are recognizable to justify a classification based on causative factors and/or the principal primary pathological manifestations.

A significant cause of massive retinal separation in juveniles is endophthalmitis due to parasitic infection.

The terms pseudoglioma and Coats's disease are misleading, and nondescriptive, and should be dropped. Some examples of massive separation of the retina due to rare causes are reported, namely, fungus infection, Cryptococcus neoformans, primary cystic retinal disease and astrocytoma.

243 Charles Street (14).

ABSTRACT OF DISCUSSION

Dr. Michael J. Hogan, San Francisco: This paper is instructive because it helps clarify the confusion created by recent extensive discussions on retrolental fibroplasia. I was struck by the number of authors who considered diseases of this type as purely of inflammatory origin. It is surprising that, in view of Coats's original observations, more effort has not been expended to expose the vascular nature of some of these lesions, which at present is only partially known. I agree with Dr. Heath that the terms pseudoglioma of the retina, Coats's disease, external exudative, hemorrhagic or massive retinitis and massive gliosis are inexact and unsatisfactory. One has at least a chance in the early stages to establish the causative factor in these cases, but in the later stages it is difficult or impossible. If the patient exhibits signs of a coincident systemic disease the diagnosis may become even more evident. In the later stages when reparative processes are complete it is impossible in most instances to make either a clinical or pathological diagnosis. I would like to ask Dr. Heath whether it would not be better to classify cases of this type as (1) congenital, due to (*a*) developmental defects, (*b*) acquired inflammation during gestation or (*c*) trauma, and (2) infantile and juvenile, due to the etiological factors proposed in his paper. I noted that he omitted trauma as a possible etiological agent, and wonder whether he would include these cases in group 3 or devise a new heading. I find it difficult to accept the heading in group 3, namely, pathological vascular permeability with separation of the retina by excessive edema or hemorrhage. Would it not be better to classify these cases as either vascular or circulatory and then attempt to subclassify the causative factor? As an example, may not angiomatous malformations, leakage from or rupture of fusiform or saccular aneurysms, and sudden arteriovenous communications produce these lesions? It is also possible that an infective embolus may erode a vessel and cause a profuse hemorrhage, thus completely masking the original cause. A serious objection to this concept is that most of these lesions should occur in the vessels of the inner retina. The resulting hemorrhage should be in the inner retina and adjacent areas; nevertheless, I know of several cases of this type which demonstrate angiomatous changes. In Dr. Heath's case of hemorrhagic type of massive separation in an infant born at eight months, the cause of death at 27 days of age was not stated, and it would be interesting to know whether there was any birth trauma, cerebral hemorrhage or evidence of prolonged asphyxia.

Dr. Parker Heath, Boston: When one attempts a classification in a field of this sort, the initial effort usually is extremely complicated, and with time one revises it more and more until ultimately it is reasonably simple. I would not quarrel with Dr. Hogan about the choice in terminology of "circulatory" or "vascular"; either would be acceptable. I think that the net result of the various types of vascular injury presented is a pathological permeability, serous or hemorrhagic. Consequently, the term "vascular" was used with the subtitle, "pathologic permeability." This seems to me more inclusive than any other terminology that could be used. In the matter of the congenital monocular defects, these are encompassed by the terms retinal aplasia or dysplasia. It is with some temerity one follows such men as Coats and Collins and attempts to alter their descriptive nomenclature, but I believe that causation is manifested in a high enough percentage of this group of patients to permit a definitive classification. It has proved to be practical in the hands of the clinicians and offers a basis for treatment and prevention.

LATERAL PHARYNGEAL DIVERTICULA AS A CAUSE OF DYSPHAGIA

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A comparatively rare cause of dysphagia not ordinarily considered in differential diagnosis is that of lateral pharyngeal diverticula. Recently we have had two examples of this disorder. In this condition the diverticula project anterolaterally from the hypopharynx at about the level of the pyriform sinuses.

We include herein a brief survey of the embryology of this condition. The lateral surfaces of the neck of the embryo become indented by four bilaterally-paired branchial grooves during the fourth to fifth weeks of embryonic life. Concurrently, four bilateral pairs of branchial or pharyngeal pouches arise internally from the lateral walls of the pharynx. These grooves and pouches correspond and lie opposite each other. Each pair is separated from the next by the branchial arches. An unpaired median outgrowth also appears in the floor of the pharynx.

The single ventral outgrowth is the thyroid diverticulum, which becomes the thyroid gland. The first pharyngeal pouch becomes the eustachian tube, middle ear and mastoid antrum. The second becomes the Rosenmüller groove in the supratonsillar fossa as well as the epithelial lining of the palatine tonsil. The third gives rise to the parathyroid glands, thymic corpuscles and reticulum of the thymus gland. The fourth leaves no definite remnants in man. The third and fourth pouches merge to form the pyriform sinus, with the dividing line at the level of the plicae nervi laryngei.

The third pouch is anterior and the fourth pouch posterior to this structure. In our patients the diverticula apparently arose from either the third or fourth pouches which were not obliterated during the normal course of development. The roentgen anatomy of the normal hypopharynx has been described elsewhere.[1]

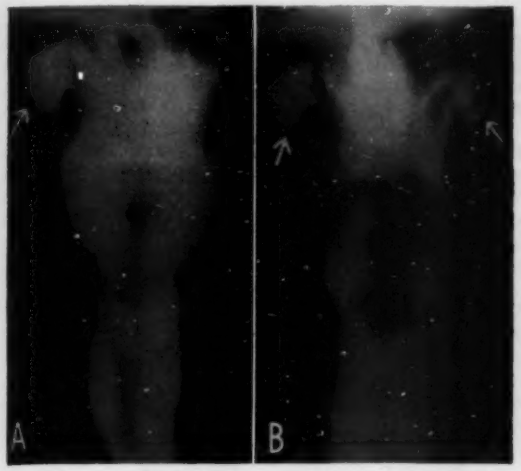

Fig. 1 (case 1).—*A*, spot film of the hypopharynx completely distended with barium, showing only the right lateral pharyngeal diverticulum. *B*, spot film of the hypopharynx showing the right and left lateral pharyngeal diverticula. This method was the only means of demonstrating this condition since the hypopharynx emptied itself of barium so rapidly. However, this does not imply that food particles would not be lodged in these diverticula and thereby cause the symptoms of which the patient complained.

Symptomatology.—The complaint is that of dysphagia. Since the diverticula retain food, the patient has a sense of fulness in the neck. One may relieve this by either emptying the sac by change in position or lavaging the diverticulum while drinking water. For obvious reasons, food which is regurgitated after being eaten will be found to be completely undigested.

Fig. 2 (case 2).—*A*, the large pharyngeal diverticulum extending laterally on the right side. A smaller diverticulum may also be noted on the left side. This is not completely filled with barium. *B*, with the hypopharynx only partially distended with barium, the centrally placed bilateral valleculae may be noted. On the right side is the oval pharyngeal diverticulum. The diverticulum on the left side is not seen because it is not distended with barium. Barium was present in the right lateral diverticulum for several hours. This would explain why pills stuck in the patient's throat and why he regurgitated undigested food.

REPORT OF CASES

The clinical manifestations and the roentgen appearance of this disorder are illustrated by the following two cases:

CASE 1.—H. L., a man aged 54, for three years prior to examination complained of food sticking in his throat. He stated that he had to swallow "real hard" to get it down. He had more difficulty in attempting to swallow solid food, but occasionally he also had difficulty with liquids. At times he might be free of dysphagia for as long as one month. He had been gaining weight, and there was no vomiting. Fourteen years previously he had been operated on for a perforated peptic ulcer, and except for a mild recurrence seven years later he remained free of gastric symptoms.

CASE 2.—H. D., a man aged 45, stated that during a period of 20 years pills "stuck in his throat." During the same length of time he frequently regurgitated undigested food, sometimes three days after ingestion. In addition, the patient gave a history of peptic ulcer of 20 years' duration and an operation 11 years previously for a perforated duodenal ulcer. He had lost 26 pounds (11.8 Kg.) in the preceding three years.

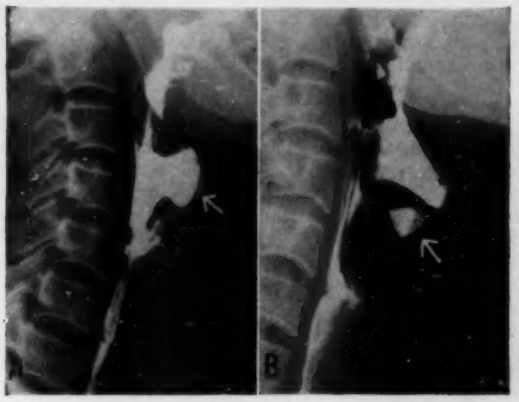

Fig. 3. (case 2).—*A*, right lateral position of the pharynx. Note the appearance of the large right pharyngeal diverticulum extending anteriorly. The valleculae were not filled with barium at the moment when the exposure was made. *B*, right lateral view of the hypopharynx. At this time the barium-filled right vallecula is clearly seen partially overlapping the right pharyngeal diverticulum below.

SUMMARY

Two cases of lateral pharyngeal diverticula as a rare cause of dysphagia are reported. With this condition in mind it is possible that physicians will discover more cases of this nature, particularly if spot film studies are made of the barium-filled hypopharynx.

1150 Fifth Avenue.

1. Buckstein, J.: The Digestive Tract in Roentgenology, Philadelphia, J. B. Lippincott Co., 1948.

Air Embolism.—An air embolus differs from a solid embolus in several ways. Whilst solid material will pass with the blood stream and stick in a vessel of its own diameter, the distribution of air is partly determined by the simple fact that bubbles in fluid will rise, and so air tends to reach the highest vessels. It has been shown experimentally that air bubbles do not pass into vessels of less than 40μ in diameter. Bubbles of this size in blood behave more like plastic solids than viscous liquids. The effects of air embolism are produced not only by mechanical blockage of blood flow, but also, since air is irritant to the vessel, by peripheral vascular spasm distal to the embolus, such as occurs with solid emboli. Apart from air embolism there are few causes of the appearance of gas in blood vessels. Decomposition and gas gangrene are unlikely to confuse the pathologist and in the case of the "bends" (caisson disease) the history will be clear. Occasionally, however, air gets into cerebral cortical vessels when the skull cap is taken off at autopsy, and it may enter the neck and other veins when these are severed. Therefore in performing an autopsy in a case of possible air embolism, the brain should be examined before the neck veins are opened or other organs removed.—C. ALLAN BIRCH, M.D., F.R.C.P. Air Embolism, *The Practitioner*, August 1950.

AUREOMYCIN IN THE TREATMENT OF INFLUENZA

A Controlled Study

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This report deals with a controlled study of the use of aureomycin in the treatment of influenza, type A′, in a military installation during the winter of 1949-1950. The study includes a total of 150 cases of serologically proved influenza A′. Of the 150 patients, 69 were treated with aureomycin, 43 were treated with penicillin and 38 received no chemotherapeutic agent.

PATIENT MATERIAL

The patients included in this study were a group of previously healthy young men, who were engaged in basic military training at an Army Post and who were admitted to the medical wards of an Army Station Hospital. The epidemic of influenza began abruptly during the first week of January 1950, rapidly reached a peak during the third week of January and subsided almost as abruptly during the following three weeks.

CLINICAL DESCRIPTION OF AVERAGE CASE

In general, the patients presented themselves with histories of an illness which was sudden in onset and which was characterized by chilliness and fever, malaise, retro-orbital pain, generalized aches and pains and soreness of the throat. In the majority of cases some degree of cough was present. In most instances these patients appeared acutely ill on admission. All were febrile. Temperatures ranged from 99 to 104 F. on admission to the wards, and in approximately one third of the patients the maximum temperatures were 103 F. or higher. Physical examination usually revealed little except the frequent occurrence of conjunctival injection, diffuse redness of the nasal and pharyngeal mucosa and occasionally the appearance of dry or moist rales in the lungs. Except in a few cases, the disease was of moderate severity and was similar clinically to that in other outbreaks encountered by us during the past four epidemic years. Complications included five cases of roentgenographically proved pneumonia resembling in appearance primary atypical pneumonia.* Bacteria regarded as etiologically significant were not isolated from any of these five patients. No complications proved to be of bacterial origin were encountered.

METHODS OF STUDY

Immediately on their arrival in the hospital, the patients were admitted to wards specifically instituted for the handling of acute respiratory illnesses. During the first half of the epidemic these patients were assigned alternately either to the aureomycin-treated group or to the penicillin-treated group, depending entirely on the time of their arrival in the ward. During the latter half of the study, patients were similarly assigned to treatment groups, a change being made, however, in that during this period every other patient was treated with aureomycin and every other patient received no chemotherapy. This grouping of patients as to treatment applied to all admissions to these wards during the period of the study; since not all these patients were found to have influenza and since only cases of proved influenza are considered here, the number of patients treated with aureomycin is not identical with the total number of patients who received penicillin or no chemotherapeutic agent.

All laboratory studies were initiated prior to institution of therapy. In addition to routine blood counts and urine examinations, throat and sputum cultures were done on each patient. Blood cultures were taken on patients who appeared most severely ill or who had evidence of pulmonary involvement. Serologic studies were done on all patients admitted to the wards. These included tests for complement-fixing antibodies on paired acute and convalescent serums for influenza A and B and for agglutination-inhibiting antibodies in those instances in which the results of former tests were inconclusive. Cold agglutination tests were done on all convalescent serums. Throat washings from six representative patients were inoculated into ferrets or fertile eggs for isolation of virus. Chest roentgenograms were taken when physical findings indicated.

TABLE 1.—*Analysis of Dosage*

Drug	Mean Total Dose	Mean Duration of Treatment, Days
Aureomycin	4.2 Gm.	4.2
Penicillin	2,700,000 units	4.5

TABLE 2.—*Analysis of Results*

Group	No. of Patients	Duration of Illness: Mean Total, Days	Duration of Illness: Mean in Hospital, Days	Mean Interval Before Sustained Temperature Drop,* Hours
Aureomycin treated	69	4.7	2.7	39.0
Penicillin treated	43	4.2	2.7	29.5
Untreated	38	4.9	3.0	40.6

* This is the mean interval between admission to the hospital or initiation of treatment and sustained temperature drop to 99 F. or lower.

CRITERIA FOR DIAGNOSIS OF INFLUENZA

All 150 patients with diagnoses of influenza A′ showed a rise in titer of fourfold or more in either the complement fixation or the agglutination inhibition tests, or in both. Virus strains isolated from throat washings of five patients during the epidemic were of the A′ type.

DOSAGE OF AUREOMYCIN AND PENICILLIN

Aureomycin was given orally in doses of 0.25 Gm. every six hours for a total daily dose of 1.0 Gm. This amount of aureomycin, one-half to one-fourth the dose frequently used, was selected because serum levels in patients receiving this dose have been found to be not much lower than those in patients on larger dose schedules [1] and because gastrointestinal toxicity has been of negligible importance in patients on the smaller dose schedule. In addition, in our experience in treating primary atypical pneumonia,[2] the therapeutic effects

The aureomycin was supplied by the Lederle Laboratories Division, American Cyanamid Company, Pearl River, N. Y.
These studies were carried out under the auspices of the Commission on Influenza, Armed Forces Epidemiological Board.
From the Medical Service, Station Hospital, Fort Ord, Calif., the Divisions of Pediatrics and Medicine, University of California Medical School, and the Viral and Rickettsial Disease Laboratory, California State Department of Public Health.

1. Brainerd, H. D.: Aureomycin Blood Levels, unpublished data.
2. Shragg, R. I.; Castagno, A. J., and Meiklejohn, G.: Aureomycin in the Treatment of Primary Atypical Pneumonia, unpublished data.

observed with smaller amounts of the drug have compared favorably with those with larger amounts. Penicillin, in the form of an aqueous procaine preparation, was given intramuscularly once daily in doses of 600,000 units. An analysis of dosage is given in table 1. Symptomatic treatment, including the use of antipyretic drugs, was held to a minimum.

ANALYSIS OF DATA

Data were analyzed with respect to total duration of illness, duration of illness observed in the hospital and duration of fever after therapy was initiated. The total duration of illness was determined as the time interval between the onset of symptoms and complete clinical recovery of the patient. The duration of fever after therapy was measured as the time interval between the onset of therapy and a sustained fall in temperature to 99 F. or below. In the untreated group, the corresponding interval of sustained drop in temperature to 99 F. or below was measured from the time of admission. Since in the majority of cases there was a variable time lag between admission of the patient to the hospital and the initiation of treatment in the groups treated with penicillin or aureomycin, proper correction for this lag was made in determining this interval in the group receiving no treatment.

ANALYSIS OF RESULTS

Results are tabulated in table 2. The mean duration of illness was 4.7 days in the aureomycin-treated group, 4.2 days in the penicillin-treated group and 4.9 days in the untreated group. The mean duration of illness in the hospital was 2.7 days in the aureomycin-treated group, 2.7 days in the penicillin-treated group and 3.0 days in the untreated group. The mean interval between institution of therapy and a sustained fall in temperature to 99 F. or below was 39 hours in the aureomycin-treated group and 39.5 hours in the penicillin-treated group. In the group receiving no treatment, the corrected mean interval between admission to the hospital and a corresponding fall in temperature was 40.6 hours.

COMMENT

In a previous study of the effect of aureomycin on influenza,[3] it was reported that the use of this drug in 18 cases was followed by rapid improvement and relief of symptoms. The authors pointed out that no parallel cases were observed without therapy. The patients were selected for aureomycin therapy because of the severity of their symptoms and actual or suspected pulmonary complications. Bacterial pathogens were found in the throat cultures of a number of patients without pneumonia but were not found in sputums of any patients with pneumonia.

In the present study the situation differed in several respects. The patients were all previously healthy young adults who were found during their hospitalization to have an extremely low carrier rate for bacterial pathogens. In addition, the patients were wholly unselected and represent a cross section of all patients with influenza during this epidemic. In this situation there was no evidence that aureomycin or penicillin influenced the course of the disease. In a different situation, with a different virus or with a high carrier rate for respiratory bacterial pathogens, a reduction in complications might result from the use of aureomycin or other antibiotics.

The question can be raised whether a larger amount of aureomycin, such as the 4.0 Gm. dose used in a previous study, might have produced a more favorable result than the 1.0 Gm. daily dose used in the present study. In answer to this it should be noted that the mean duration of fever in the untreated patients was only 40.6 hours after they had reached the stage of their illness when treatment would have been begun. This is within the mean period generally allowed for an effective chemotherapeutic agent to cause a return of temperature to normal. If this assumption is valid, the dose and, for that matter, the use of the drug lose much of their relevance.

CONCLUSIONS

In a controlled study of the effect of aureomycin in the treatment of influenza A′, in 150 consecutive unselected cases occurring during an epidemic, the course of the illness in patients treated with this drug was not significantly different than that observed in patients who received penicillin or no chemotherapy at all.

3. Finland, M.; Wells, E. B.; Collins, H. S., and Gocke, T. M.: Aureomycin in the Treatment of Influenza and Certain Other Acute Respiratory Diseases With or Without Pneumonia, Am. J. Med. **8**: 21 (Jan.) 1950.

CLINICAL PHYSIOLOGY OF POTASSIUM

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Though it has been known that the cell membranes are freely permeable to water, dextrose, oxygen, carbon dioxide, urea and other nutrient and excretory products, it was believed in the past that they were impermeable to sodium, potassium and other electolytes. That is how the great difference in concentration of these ions on the two sides of the membrane was explained. Ideas on this subject have been sharply modified in the last few years, and this modification has led to a much better understanding of the clinical physiology of potassium and to better therapy of dehydration. Studies with radioactive isotopes of sodium and potassium and with heavy water [1] have shown that the cells are permeable to sodium and potassium. This permeability is slow compared with that of water. When heavy water was injected intravenously by Moore,[1a] equilibrium with the total body water was established in 120 minutes. When radioactive sodium was injected, equilibrium with extracellular sodium was reached in 60 minutes but not with total body sodium until 24 hours. Radioactive potassium requires 15 hours before reaching equilibrium with cellular potassium.

The average concentration of serum potassium in normal human subjects is about 4.7 milliequivalents per liter (18.2 mg. per 100 cc.). The range of normal is from 4.0 to 5.4 milliequivalents per liter (16 to 21 mg.) per 100 cc.[2] In the intracellular fluids, the concentration of potassium is much higher, for here potassium is the principal cation, the cellular sodium concentration being low. If the recent data [1b] on dogs can be translated to human subjects, the average normal potassium concentration in all cellular fluid is about 115 milliequivalents per liter of cellular water, or some 23 times

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1. (*a*) Moore, F. D.: Adaptation of Supportive Treatment to Needs of Surgical Patient, J. A. M. A. **141**: 646 (Nov. 5) 1949. (*b*) Levitt, M. F., and Gaudino, M.: Use of Radioactive Isotopes to Measure Intracellular Cation Concentrations in the Normal Dog, Am. J. Physiol. **159**: 67, 1949.

2. Hoffman, W. S., and Jacoba, H. R. D.: The Partition of Potassium Between the Serum and Corpuscles in Health and Disease, J. Lab. & Clin. Med. **19**: 633, 1934.

that of the serum. The total potassium content of the adult body is about 4,000 milliequivalents (160 Gm.), of which only 70 milliequivalents (2.7 Gm.) is in the extracellular fluids (fig. 1).

There is no adequate explanation of how and why the tissue cells acquire and maintain so much higher a concentration of potassium than that of the serum or interstitial fluids. Since it has been repeatedly demonstrated that potassium leaves the cells during potassium losses from the body [3] and enters cells during its administration,[4] it appears then that there is normally an equilibrium being maintained between the low extracellular concentration and the high cellular concentration. This equilibrium is unstable, to be sure, in opposition to osmotic forces which tend to equalize the concentrations. It is reasonable to believe that this unstable equilibrium is being maintained by the oxidative energy of the cells. If this be so, then cellular anoxia would tend to send potassium out of the cells into the extracellular fluids. Such a phenomenon might account for the rise in serum potassium concentration with exercise [5] and in agonal states and might explain the progressive transfer of red cell potassium to plasma in stored blood.

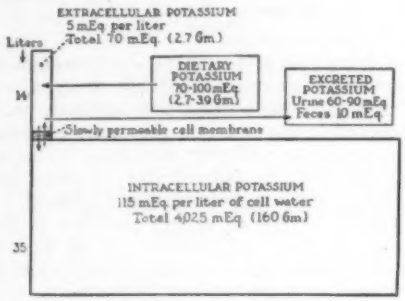

Fig. 1.—Normal distribution of body potassium.

Factors tending to increase serum potassium concentration are (1) increased potassium intake, (2) oliguria or anuria, (3) tissue breakdown or anoxia, (4) contraction of extracellular volume by dehydration and (5) adrenal cortical deficiency. Factors tending to decrease serum potassium concentration are (1) limitation of food intake, (2) increased renal excretion of potassium —(*a*) diuresis, (*b*) acidosis and (*c*) adrenal cortical hyperactivity—(3) dilution of extracellular fluid with potassium-free fluids, (4) vomiting or diarrhea and (5) glucose uptake by cells. Actual serum potassium concentration is determined by balance of all factors operating at the moment.

The equilibrium between extracellular and intracellular potassium is constantly being interfered with by a number of events which serve temporarily to raise or lower unduly the concentration of serum potassium, because they occur faster than the slow permeability of the cell membrane permits the reestablishment of equilibrium. The most important of these factors are as follows:

1. Potassium is constantly being excreted from the body by a renal mechanism designed for efficiency in removing excess potassium rather than conserving it during deficiency. The renal losses are exaggerated by diuresis, acidosis and excess adrenocortical hormone.

2. Potassium is present in the gastrointestinal secretion in high concentration. Gastric juice may at times contain as much as 40 milliequivalents of potassium per liter.[6] The concentration in intestinal juices is usually 8 to 10 milliequivalents per liter.[6a] Normally almost all the potassium in these secretions is absorbed through the mucosa back into the blood, so that the daily feces seldom contain more than 10 milliequivalents. But in diarrhea or vomiting, the losses of potassium may be 10 to 20 times that amount.

3. From 70 to 100 milliequivalents of potassium are usually ingested daily with food. After a meal rich in potassium, the serum potassium level rises slightly but soon subsides to the previous level. In the normal adult person none of this potassium intake is stored; instead it is excreted in the urine.[7] In gastrointestinal disease not only is potassium of the secretions lost with vomiting or diarrhea but the normal ingestion of potassium is prevented, while the kidneys continue to excrete potassium.

4. In starvation, trauma and disease, cellular breakdown occurs. The potassium of these destroyed cells is added to the extracelluar fluid often at a rate greater than that at which it can be removed either by excretion or by transfer to cells.[8] For every gram of nitrogen broken down, about 2.4 Gm. of potassium are released.

5. Glycogenesis carries potassium from extracellular fluid into the cells. This process occurs in specialized tissue that contains glycogen, such as liver and muscle. It is increased by glucose ingestion, by insulin and by epinephrine.[9] The fall in serum potassium levels is rapid (a matter of minutes) but temporary. In the normal persons the change in serum potassium concentration is negligible, but in potassium-deficient persons, like those with diabetic acidosis, the rapid decline of an already low serum potassium concentration may produce serious symptoms. The phenomenon occurs in extreme degree in familial periodic paralysis.

6. Expansion of the extracellular fluid compartment in the treatment of dehydration by intravenous administration of potassium-free fluids produces a rapid lowering of the serum potassium concentration, because of (1) dilution of the extracellular compartment by the injected fluid, (2) influx of water from cells to lower the osmotic pressure of the interstitial fluid and raise that of the cellular fluid and (3) increased excretion of potassium.[10] When the cells have already lost much water some of the transfer of water from the cells is ultimately annulled by transfer of sodium into the cells.

7. When potassium is lost from the body via the kidneys or the gastrointestinal tract, a good portion of it is accompanied by chloride, which has come from the extracellular fluids. This unbalanced loss of extracellular anions is compensated for by a rise in extracellular bicarbonate. That is apparently why acute potassium

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5. Fenn, W. O.: The Role of Potassium in Physiological Processes, Physiol. Rev. **20**: 377, 1940.

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deficiency is usually associated with alkalosis.[11] If such alkalosis is treated by administration of sodium chloride solutions, more potassium is lost, if renal function is good, along with chlorides; the alkalosis tends to persist, and edema is produced. On the other hand, administration of potassium chloride raises intracellular potassium concentration and that of extracellular chloride and dissipates the alkalosis.

8. Except possibly in the case of familial periodic paralysis—and maybe even there—a low serum potassum concentration always means potassium deficiency, though the intensity of that deficiency cannot usually be diagnosed from the serum level itself.[12] On the other hand, potassium deficiency may be present when serum potassium concentration is within normal limits or even higher than normal. For example, a 15 per cent loss of potassium from the body (equal to 24 Gm.) may produce a drop of serum potassium from a level of 5.2 milliequivalents per liter to 4.4 milliequivalents per liter, if equilibrium has been established. The latter concentration is still within normal limits. What probably is more important is the fact that conditions associated with severe losses of potassium also produce a breakdown of body tissue; the potassium released from these destroyed cells into the extracellular fluid, in association with dehydration and with limited renal output, may raise the serum potassium concentration momentarily to normal or even higher than normal values. The true state of affairs can usually be recognized by serum potassium analysis after several liters of saline solutions have been administered.

CLINICAL MANIFESTATION OF HYPERPOTASSEMIA AND HYPOPOTASSEMIA

Symptoms of hyperpotassemia chiefly involve the heart. Paresthesias of the extremities and flaccid paralysis have been reported,[13] but in most instances the cardiac observations are the only significant ones. There are characteristic electrocardiographic changes.[14] The T wave becomes increasingly taller with a narrow base; this can be seen with serum potassium levels of 7.5 milliequivalent per liter (29.3 mg. per 100 cc.). With higher levels, as the T wave becomes even higher, the QRS complex becomes progressively broader, indicating intraventricular conduction defect. The P wave may disappear. Ultimately the heart stops in diastole. Death can occur when the serum level reaches 10 milliequivalents per liter (39 mg. per 100 cc.), but reversible changes have been known to occur even at higher levels.[15] It is important to recognize that these changes are due entirely to the extracellular accumulation of potassium. The intoxication may take place even in the presence of severe cellular deficiency of potassium. That is why it is important to administer potassium slowly and preferably via the stomach, even in pronounced deficiency; extreme care is required when renal function is too poor to permit rapid adjustment of the serum potassium concentration.

Since in almost all instances of hypopotassemia there is pronounced cellular deficiency of potassium, many of the symptoms may be due to the latter rather than to the low serum levels.[12] Yet the fact that the muscular paralysis of familial periodic paralysis occurs when the serum potassium level falls as a result of potassium entering the cells makes it certain that the low serum level is responsible for this symptom. In familial periodic paralysis it is usually the muscles of the extremities that are seriously involved; in diabetic acidosis following insulin treatment, it is the respiratory muscles that are affected. Perhaps it is the most fatigued muscles that show the greatest effect of the low serum potassium.

The electrocardiographic observations associated with low serum potassium concentrations are in several respects the opposite of those found with high serum potassium levels and are therefore probably directly due to the low extracellular potassium concentration.[16] There is progressive lowering and broadening of the T wave and lengthening of the Q-T interval. The S-T segment usually becomes depressed. As the serum potassium falls still further a U wave may make its appearance. All these abnormalities may disappear on the raising of the serum potassium concentration by injection of potassium salts.

There are other clinical manifestations associated with low serum potassium levels which are probably produced by the cellular deficiency in potassium. Unfortunately these symptoms are not specific; they may be found in many debilitating conditions. They are extreme muscular weakness, anorexia, lethargy, distention of the intestine, myocardial degenerative changes and edema of the lungs. Often these symptoms become evident after much saline therapy.[17]

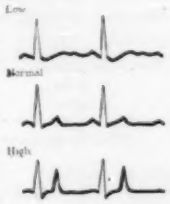

Fig. 2.—Electrocardiograph changes (idealized) produced by changes in serum potassium concentration, shown for unchanged heart rate.

CLINICAL CONDITIONS INVOLVING VARIATIONS IN BODY POTASSIUM

Diabetic Acidosis. — During the development of acidosis,[18] glucose and keto acids are excreted in large quantities, carrying with them much fixed base. There is an accompanying polyuria. In addition, vomiting in these cases enhances the loss of water, fixed base and chloride. The resulting contraction of extracellular fluid volume and lowering of its sodium, chloride and bicarbonate content is well known. But it is now recognized that large losses of potassium also occur, even though the serum concentration at the height of dehydration may not be lowered.[19] The dehydration not only is extracellular accompanied by sodium and chloride loss but is intracellular with potassium and phosphate loss. Treatment in the past has been to give insulin, isotonic sodium chloride solution and alkali, either as sodium bicarbonate or as sodium lactate. In most instances, when the patient has not been dehydrated and acidotic to the point of collapse, this

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19. Martin, H. W., and Wertman, A.: Serum Potassium, Magnesium and Calcium Levels in Diabetic Acidosis, J. Clin. Investigation **26**: 217, 1947.

treatment is satisfactory, for the patient is quickly brought back to consciousness. Then oral administration of milk and orange juice furnishes the necessary glucose, calories and potassium to permit rapid convalescence. In some instances, however, consciousness does not return so fast. In these, further injections of saline and lactate solutions, along with insulin (with or without dextrose) produces a characteristic train of events. First the extracellular fluid is expanded and the serum potassium level falls. The improved renal function produces a further loss of potassium. Then the sudden availability of insulin with its accompanying glycogenesis in liver and muscle produces a rapid transfer of extracellular potassium into these tissues. The consequence of all of these factors is an abrupt fall of serum potassium to a level producing respiratory paralysis and cardiac damage. That is why a number of patients in deep diabetic coma treated this way have appeared to improve at first and have then become worse and died. This catastrophe can be avoided in many instances by the judicious use of potassium chloride along with sodium chloride and sodium lactate. The potassium chloride should be given preferably by mouth or stomach tube, 2 Gm. at a time. It may be given successfully by proctoclysis. If given intravenously, a liter of fluid should not contain more than 2 Gm. of potassium chloride.

TABLE 1.—*Water and Electrolyte Losses in Infantile Diarrhea per Kilogram of Body Weight**

	Total	Extracellular	Intracellular
H_2O (Gm.)	125.0	80.0	45.0
Na (mEq.)	9.5	11.2	—1.7
Cl (mEq.)	9.2	9.2	0
K (mEq.)	10.4	0.4	10.0

* Calculated from Darrow's data.[20]

TABLE 2.—*Composition of Darrow's Solution*

	Gm. per 100 Cc.		mEq. per Liter
NaCl	0.40	Na	123
KCl	0.26	K	35
Sodium lactate	0.50	Cl	105
		Lactate	53

Infantile Diarrhea.—Darrow and his co-workers [20] have made balance studies in infants recovering from severe infectious diarrhea. Those infants who were given potassium in addition to sodium, chloride, dextrose and lactate made the most rapid recoveries and had a negligibly low mortality rate. Darrow demonstrated that during the period of diarrhea the losses per kilogram of body weight were water, 125 Gm.; chloride, 9.2 milliequivalents; sodium, 9.5 milliequivalents, and potassium, 10.4 milliequivalents (table 1). The water loss was equal to one half of the total extracellular fluid. However, if one assumes that the lost chloride was all extracellular, then about one third of the lost water came from the cells. The sodium loss from extracellular fluid should have been about 25 per cent more than that of chloride; therefore, that portion of the sodium had not left the body at all but was in the cells replacing part of the 10 milliequivalents of potassium lost from the cells. The loss of potassium represents about 15 per cent of the total body store of potassium. When these infants were treated with fluids not containing potassium, they continued to lose 1 to 1.5 milliequivalents of potassium per kilogram per day; but, if the repair solutions contained adequate quantities of potassium, positive balances of potassium up to eight milliequivalents per kilogram could be obtained in three days. However, Darrow learned that if potassium was given in the presence of circulatory and renal inefficiency, the serum potassium concentration rose rapidly to dangerous levels. Therefore, he recommended initial intravenous infusions of isotonic sodium chloride solution and 5 per cent dextrose along with blood or plasma until circulatory and renal function had been restored. Then he gave subcutaneously a solution containing 0.4 Gm. of sodium chloride, 0.26 of potassium chloride and 0.59 of sodium lactate. This fluid (now called Darrow's solution) can also be given orally, diluted with two parts of five per cent dextrose in water, whenever the clinical condition permits this avenue of administration.

Butler and his associates [21] have come to essentially the same conclusion. Their repair solution is more hypotonic and contains relatively less sodium and more potassium. They, too, recommend initial treatment with saline solution and blood if circulatory and renal failure is present.

Surgical Conditions.—Randall and his co-workers [6a] have shown with balance studies preoperatively and postoperatively on surgical patients that the potassium losses were two to three times higher than would be anticipated from the nitrogen loss. Therefore, this extra potassium came from intact cells. The loss occurred not only because of potassium deprivation in the presence of normal urinary excretion but because of removal of potassium by vomiting, suction drainage and diarrhea. In addition to these losses, additional potassium was excreted in the urine as part of the alarm reaction that occurred with the disease and the operative management. These authors found that patients who received, in addition to the usual alimentation with saline solutions, dextrose and amino acid solutions, 2 Gm. of potassium daily preoperatively and postoperatively, did not have negative balances of potassium and for the most part maintained normal serum potassium levels.

Uremia.—As early as 1934 I [2] reported that the serum potassium levels in uremia may be low, normal or high. This observation has been confirmed many times.[22] Modern studies of renal excretion of potassium clarify [23] the causes of this variability of potassium concentration. A normal intake of 70 milliequivalents of potassium requires a potassium clearance of only 10 cc. per minute to maintain the normal potassium concentration. Since about 130 cc. of plasma are cleared of potassium by glomerular filtration, the normal kidney must reabsorb more than 90 per cent of the filtered potassium to keep from exhausting the body supply. Actually, even more potassium than is filtered is present in the fluid reaching the reabsorbing tubular cells, for some potassium is also excreted by tubular excretion. The quantity reabsorbed varies inversely with the serum potassium concentration, so that excretion is more effective when excess potassium is in the extracellular fluids.

20. Darrow, D. C.; Pratt, E. L.; Flett, J., Jr.; Gamble, A. H., and Wiese, H. F.: Disturbances of Water and Electrolytes in Infantile Diarrhea, Pediatrics **3**: 129, 1949.

21. Reyersbach, G. C.; Butler, A. M., and Talbot, N. B.: Persistent Infectious Diarrhea in Infants, Am. J. Dis. Child. **75**: 450 (March) 1948.

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There is probably a hormonal inhibition of this reabsorption. Other factors, such as osmotic diuresis and the excretion of large quantities of acids, also limit the reabsorption of potassium. In nephritis with a diminution of glomerular filtration, potassium filtration becomes diminished, but tubular excretion may not be interfered with to such an extent. Furthermore, tubular reabsorption more distally is less complete because of the rapid flow and because of damage to the tubules. As a consequence the clearance of potassium may remain higher than 10 cc. per minute, even when the glomerular filtration rate is less than that, so long as there is no oliguria (table 3). Since uremic patients usually eat poorly and have frequent spells of vomiting or diarrhea, the total effect may actually be potassium deficiency with low serum potassium concentration. However, if the intake is large, the serum potassium levels may be normal. If oliguria sets in and is associated with tissue breakdown, retention of potassium may occur rapidly. The serum potassium concentration may reach 8 to 10 milliequivalents per liter. In these instances death in uremia is hastened by the toxic action of potassium on the heart. From a clinical point of view potassium in the food is usually harmless, so long as the uremic patient is in a condition to eat well. But medication containing potassium, which in the past has often been used for treatment of uremic acidosis, may quickly prove harmful.

TABLE 3.—*Renal Excretion of Potassium (at Serum Concentration of 5 mEq. per Liter)**

	Plasma Cleared per Minute, Cc.	Potassium per Minute, mEq.
Normal		
Glomerular filtration	130	0.65
+ Tubular excretion (rough estimate)	50	0.25
	180	0.90
— Tubular reabsorption	170	0.85
Net clearance	10	0.05
	(= 72 mEq. or 2.8 Gm. per 24 hours)	
Uremia Without Oliguria		
Glomerular filtration	5	0.025
+ Tubular excretion (rough estimate	15	0.075
	20	0.10
— Tubular reabsorption	10	0.05
Net clearance	10	0.05
	(= 72 mEq. or 2.8 Gm. per 24 hours)	

* Possibility of identical excretion of potassium in normal persons and those with uremia but without oliguria.

COMMENT

A final word should be devoted to the principle of repair fluid management. Patients in dehydration have many deficiencies involving both the extracellular and cellular compartments. These include red cells, plasma proteins, water, sodium, chloride, bicarbonate, potassium, phosphorus, amino acids, dextrose and vitamins. Physicians have tended in recent years to attempt massive repair by dumping these constituents into the blood stream by rapid intravenous infusions. Such attempts are based on unsound physiological principles. Utilization by the cells of the proffered constituents is limited by the slow permeability of the cellular membrane and by the disturbance of cellular metabolism produced by intoxication, relative anoxia and alarm reaction.[18] In addition, such repair is usually initiated when circulation is poor and renal power of selective excretion is limited. Even the repair of the vascular and interstitial compartments must be made at a rate slow enough to avoid overburdening the heart and to prevent the "speed shock" of too rapid a change in the concentration of pharmacodynamically active constituents. In general the quantity and makeup of the intravenous infusions and the order of their administration should be designed to restore vital functions first, such as blood volume, oxygen-carrying power, blood pressure, renal circulation and normal p_H. If such treatment restores consciousness and enables the patient to take fluids and nourishment by mouth, oral alimentation should then become the mainstay of the repair management, particularly with respect to potassium. The use of Ringer's solution instead of istonic sodium chloride solution for the initial injections will at least tend to prevent the dilution of extracellular potassium concentration. If more potassium has to be given intravenously, not more than 2 Gm. of potassium chloride should be present in any liter of venoclysis fluid. No extensive intravenous potassium management should be undertaken unless adequate laboratory facilities are available for quick potassium determinations. In fact, no program of repair management is safe without frequent examinations which include the clinical examination of the patient, determination of the urine volume, specific gravity and p_H, as well as serum analysis for chloride, bicarbonate and, preferably, sodium and potassium.

ABSTRACT OF DISCUSSION

DR. HELEN EASTMAN MARTIN, Calif.: Analysis of the etiology of potassium deficits in 150 patients with serum potassium levels under 4.2 milliequivalents per liter, at the Los Angeles County Hospital illustrates all the major mechanisms mentioned by Dr. Hoffman as causing shifts of body potassium. Hypopotassemia, due to either poor food intake or use of nasogastric suction and potassium-free parenteral fluids, developed in 131 of the patients. The average period of time of poor food intake prior to development of a low serum potassium was 16.3 days. Low serum potassium levels developed 5.3 days after institution of nasogastric suction plus 7.5 days of previous poor food intake. Nine of the patients had loss of potassium from the gastrointestinal tract or urine as the major cause of the potassium deficit. Shifts in potassium during treatment of diabetic coma accounted for low serum potassium levels in 10 of the patients. The relation of the acid-base balance was analyzed separately; the importance of alkalosis is seen by the fact that 64 patients had alkalosis. In the last few years my associates and I have treated without difficulty over 500 patients with low serum potassium levels. This includes 50 patients with diabetic coma. Therapy has been mainly by the intravenous route. Dehydration is corrected first, and dilute solutions of potassium salts are given slowly to prevent rapid shifts in the serum level. Concentrated solutions are given only if alarming symptoms, such as muscle paralysis, are present. Such concentrated solutions are administered slowly and cautiously and followed with frequent serum potassium determinations or frequent electrocardiograms. The treatment schedule we have used is as follows: 1. Prophylaxis of potassium deficits (mainly postoperative patients), 3 to 6 Gm. of potassium chloride every 24 hours given intravenously as a 0.1-0.2 per cent solution at rate of 1 liter every one to two hours. 2. Treatment of acute deficits (acute alkalosis, diarrhea), 6 to 9 Gm. of potassium chloride every 24 hours given intravenously as a 0.1-0.2 per cent solution as above. (This includes maintenance dose.) 3. Severe, chronic deficits (mainly surgical patients with loss of gastrointestinal content maintained for days on gastrointestinal suction and potassium-free parenteral fluids), 20 Gm. of potassium chloride every 24 hours given cautiously and intravenously as a 0.3-1 per cent solution or 10 Gm. of

potassium chloride every 24 hours intravenously plus 10 Gm. of potassium chloride orally, and 4. Diabetic coma, 2 to 4 Gm. of potassium chloride intravenously as 0.1-0.2 per cent solution. If urine output is adequate, additional treatment with 12 Gm. potassium chloride orally every 24 hours (2 Gm. every four hours) should be started in the second to the fourth hour of coma.

DR. A. C. CORCORAN, Cleveland: Dr. Martin's comments on the value of potassium repletion in the treatment of recovering diabetic coma bring to mind the wisdom of my former chief, Dr. I. M. Rabinowitch, of Montreal, in his routine insistence on the use of salt fat-free broth, 1 cupful every hour on the hour. Some of our visitors seemed to look on this procedure as old fashioned and suggested the substitution of infusions of sodium chloride. However, a favorable clinical course and a low mortality rate prompted Dr. Rabinowitch to maintain his position, and we now find justification for it in the potassium supplied in the broth. The technics of blood chemistry in current use deal only in terms of concentration, whereas the physiology of fluid balance and fluid repletion deals with volumes and contents. It is to be hoped that the technics of the near future may bring to the clinician his guiding answers in terms of fluid compartments. Dr. Hoffman has made valuable contributions to blood chemistry as it exists now. I urge him to participate in this further development. Dr. Darrow has drawn attention to the association of potassium depletion with hypochloremic resistant alkalosis. A recent observation, made in consultation, emphasizes this point. The patient in question had vomited and had a biliary fistula. She had a severe alkalosis and was incontinent and confused. An electrocardiogram, obtained to detect hypopotassemia, was unfortunately mislaid at the outset; the presumption was that this was an alkalosis due to acid loss. A total of 400 milliequivalents of chloride ion as hydrochloric acid was infused during 24 hours. This infusion had effected no substantial change in the patient's clinical condition, in the serum concentrations of chloride and carbon dioxide or in the electrocardiogram. The electrocardiogram was found to show evidence of hypopotassemia. With provision of only 54 milliequivalents (4 Gm.) of potassium chloride, she roused from her coma, her electrocardiogram improved, the serum carbon dioxide substantially decreased and chloride increased to almost normal levels. Thus, an unintentional clinical experiment showed the extreme resistance of the alkalosis in potassium deficiency. In the subsequent nine days the patient received potassium chloride at the rate of 4 to 8 Gm. daily to a total of 40 Gm., or 536 milliequivalents, of potassium. The clinical condition steadily improved. The electrocardiogram was improved but not to normal, and the serum potassium reached a level of only 3 milliequivalents per liter. The patient thus also demonstrated the extreme degree of potassium depletion which may pass unrecognized. Especially does this case emphasize, as do others in the collection of Drs. Proudfit and Ernstene at the Cleveland Clinic, the usefulness of the electrocardiogram in the diagnosis of a hypopotassemic state whenever rapid methods for the determination of serum potassium are not available. Finally, a note on a patient whose renal damage from chronic pyelonephritis made it difficult to excrete not only protein metabolites but the salts which were provided during treatment of dehydration consequent on intestinal obstruction. In this patient the blood urea reached the level of 330 mg. per 100 cc. and the total base 176 milliequivalents during treatment with a mixture of water as 5 per cent dextrose and Ringer's solution in about a 3:1 ratio, liter for liter. A change in the ratio of the fluid repletions to 5 liters of water and 1 liter of Ringer's solution resulted in gradual recession of the blood urea level, an increase in urine volume from 2 to 4 liters, restoration of total base to 140 milliequivalents and progressive improvement with eventual return of the blood urea to nearly normal. Hypertonicity of body fluids due to administration of more electrolyte than this patient could excrete actually increased the existing dehydration and aggravated his renal failure. A urine volume of some 2 liters was in fact inadequate for him, because renal disease increased his minimum effective urine volume. This case demonstrates then the serious effect of relative electrolyte excess and the importance of regulating urine volume, not by rule of thumb but by attention to the level of renal function.

EXHAUSTION IN THE YOUNG BUSINESS EXECUTIVE

Diagnosis and Treatment

SIDNEY A. PORTIS, M.D.
IRVING H. ZITMAN, M.D.
and
CHARLES H. LAWRENCE, M.D.
Chicago

Industry has come to recognize that the toll of death and disability in the management group is excessive. This is evidenced by the report of the Labor Economic Section of General Motors Corporation in 1944 [1] that 189 men in that corporation's management group had died in the preceding five years. Realizing that the health maintenance program for the supervisory group had proved inadequate, the corporation set up a program of diagnostic health examinations to prevent this catastrophic loss. The Life Extension Institute reported that of 1,000 holders of life insurance policies in amounts of $25,000 or over who had received extensive examinations since Jan. 1, 1938, of whom 81 per cent were more than 40 years of age, 79 per cent were found to have physical impairments (18.5 per cent of which were high blood pressure and 22 per cent abnormalities of the heart). More recently, Franco [2] reported that periodic health examinations uncovered major medical disease in 25 per cent of executives examined. In *Fortune* [3] for June 1950, there was an article, "Why Executives Drop Dead." It quoted from a report of the Life Extension Examiners of New York that 60 per cent of the executive group examined had conditions requiring a physician's attention, the larger part of them of a cardiovascular nature. In view of the foregoing surveys and others, we should like to present our observations, which may shed light on some disabling factors that, if permitted to go unrecognized, may produce morbidity and mortality of a degree similar to that already reported.

Exhaustion in executives has not been stressed by other investigators in surveys previously published. We became especially interested in this phase of a patient's complaint through our studies on fatigue states as related to a disturbance in carbohydrate metabolism. For many years we have seen young business executives in their early forties or fifties who became utterly exhausted. These executives had many disorders interfering with their efficiency. Apparently they started out in their jobs with all the zest and enthusiasm and ambition to reach a goal which would give them prestige, affluence and security. Most of them were college trained, and many had graduate education preparing them for their life work. Why did men with such drives manifest disabilities at an age at which they should have been most productive? Why did these men live under tension which not only affected them but projected their emotions on employees under their supervision? Why were some departments in industry more productive than others engaged in similar lines of work? Physicians must furnish answers to all these questions if the health

From the Medical Department of Michael Reese Hospital.

Read before the Section on Preventive and Industrial Medicine and Public Health at the Ninety-Ninth Annual Session of the American Medical Association, San Francisco, June 29, 1950.

1. Lutz, E. F.: Conserving the Health of Management, Occup. Med. **2**: 599-605 (Dec.) 1946.
2. Franco, S. C.: Periodic Health Examination of Executives, Indust. Med. **19**: 213-219 (May) 1950.
3. Why Executives Drop Dead, Fortune **41**: 88-91 (June) 1950.

and welfare of executives are to be preserved and if the harmony and safety of their employees are to be guarded at all times.

We therefore undertook a comparative study of the last 50 business executives under the age of 50 who consulted us as patients and of a similar group of executives who were referred to us by corporations for prophylactic examinations.

GROUP OF PATIENTS

The group of executive patients was studied by careful history taking, physical examination and thorough laboratory and roentgenologic investigation to evaluate the clinical picture. It is interesting to note that in 60 per cent (fig. 1) of this group fatigue was one of the outstanding complaints. The evaluation of this complaint is complex, because it is largely subjective and must be evaluated on an individual basis. Heretofore there has not been an objective measurement of this symptom.

In 43.3 per cent (fig. 1) of the fatigued group we found a more rapid disappearance of the sugar from the blood as measured by the three hour intravenous dextrose tolerance test (table 1, fig. 2); in other words, these patients had relative hypoglycemia.

TABLE 1.—*Mean of Blood Sugar Tolerance in 43.3 per Cent of the Fatigued Group*

Time of Test	Blood Sugar Levels, Mg./100 Cc.
Fasting	73.6
½ hr.	118.8
1 hr.	74.8
2 hr.	61.2
3 hr.	56.4

The clinical significance of this has been stressed in previous communications.[4] In 58 per cent of the entire group of executive patients, the third hour blood sugar level was below the initial level, determined during fasting. In some instances there was a drop of 30 to 40 mg. per 100 cc., while in others the drop was between 5 and 15 mg. One severely fatigued executive showed a fasting level of 87 mg. per 100 cc., and at the third hour his blood sugar level had dropped to 44 mg. This relative hypoglycemia has been shown in previous studies to be an effect of overstimulation of the islet cells of the pancreas, mediated by the parasympathetic nervous system via the vagi. Blocking of the vagus nerves with atropine sulfate throughout the 24 hour period has resulted in the elimination of this drop in blood sugar values. Several patients who have had a vagectomy for treatment of peptic ulcer have shown restoration of the intravenous dextrose tolerance curve to near normal. If the autonomic nervous system is involved in this disturbance of function, as these observations suggest, the origin of the disturbance must be in the emotional centers of the central nervous system. The brain is highly susceptible to changes in nutrition. The most important food that the brain uses is sugar. Our studies in fatigue states reveal that when an inadequate amount of dextrose circulates in the blood, the brain does not function properly, the patient becomes high-strung and easily fatigued and the body does not maintain its competence. A more or less constant feature in the life situation of the tired young business executives treated was a loss of zest, loss of enthusiasm and boredom and antipathy for their jobs, business superiors and associates.

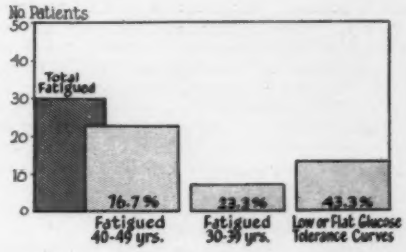

Fig. 1.—Incidence of fatigue in the 50-patient executive group.

Psychological studies have revealed that executives with somatic symptoms are as a rule dependent men whose insecurities and feelings of inferiority are great. Their drives to succeed are a reaction to their intense fears of being inadequate, which are expressed as insatiable ambition, producing somatic symptoms in the gastrointestinal, cardiovascular, respiratory and neuromuscular systems. The executives' interpersonal relations appear adequate on the surface, as far as their business associates are concerned. However, their reaction to their families is frequently hostile, so that their wives and children as a rule are injured. Frenzy and repressed aggression, frequently on an unconscious basis, are present in most such persons, though they manifest strong defenses against expressing their psychological weaknesses. Their capacity for getting pleasure out of life is limited.

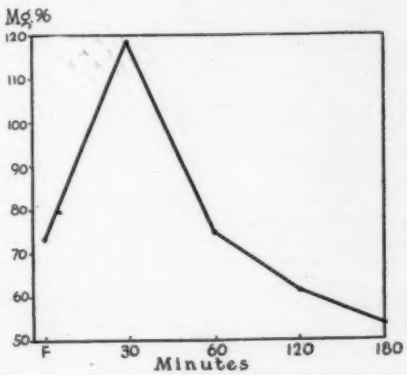

Fig. 2.—Intravenous dextrose tolerance test of the fatigued group. Average of curves of 43.3 per cent of fatigued patients.

Another significant characteristic of the executive's thinking is a fear of failure. Even though the executive can look back with some pride on his accomplishments, there is always apprehension or fear that all will not be the same tomorrow. The fear is not so much of loss of material things as of loss of pride. These psychosomatic manifestations are well illustrated by the following report of an executive patient.

4. Portis, S. A., and Zitman, I. H.: A Mechanism of Fatigue in Neuropsychiatric Patients, J. A. M. A. **121**: 569 (Feb. 20) 1943. Alexander, F., and Portis, S. A.: A Psychosomatic Study of Hypoglycaemic Fatigue, Psychosom. Med. **6**: 191 (July) 1944. Portis, S. A.: The Medical Treatment of Psychosomatic Disturbances, J. A. M. A. **126**: 413 (Oct. 14) 1944; Life Situations, Emotions and Hyperinsulinism, ibid. **142**: 1281-1286 (April 22) 1950.

REPORT OF CASE

A business executive, 37 years of age, had felt well until nine days prior to consultation, when at 3:30 p. m., as he was walking through the factory, he suddenly felt light-headed, began to perspire and noticed quickening of his heartbeat. His legs felt weak and he had to sit down. The company physician found his systolic blood pressure at that time to be 110. He was taken to the hospital, where an electrocardiogram and blood count were within normal limits. He remained in the hospital only one hour. However, after that time he continued to feel weak and tired; he became light-headed when up and around but felt normal when lying down. It tired him to walk one block, but he experienced no shortness of breath. He stated that on the day preceding the onset of these symptoms he thought he had overexerted himself. His muscles ached and felt dull, as though they were tired, and he noticed a peculiar sensation over the middle anterior part of the chest. This sensation disappeared almost entirely, yet walking a half block still brought on a "choked-up" feeling.

Physical examination revealed nothing of clinical significance. Except for the intravenous dextrose tolerance test (fig. 3), thorough laboratory and roentgenologic studies gave normal results. The dextrose tolerance curve, however, resembled the so-called "flat curve" which we had previously observed in

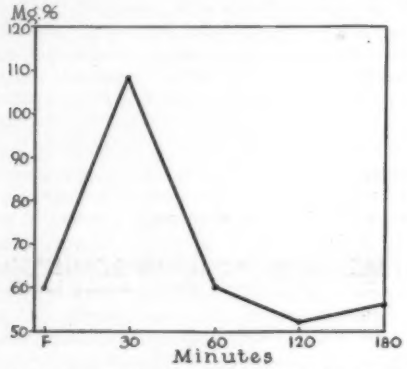

Fig. 3.—Intravenous dextrose tolerance test of patient aged 37.

fatigue patients. This "flat curve" is characterized by a lower than normal level at the half-hour determination and failure of the blood sugar to return to the fasting level in three hours.

Because we were interested in discovering what precipitated the acute condition which had persisted for nine days, we inquired into the psychological factors which might have brought about the breakdown. We found that the patient was employed by a concern which had decided shortly after the war that a plant in a small town would be better suited than their current plant to their specifications and purposes. They moved their key employees into a small community, built homes for them and set them to work. For the first few years of operation of this plant, operations went at top speed and with the smoothness of a fine watch. However, after four or five years the management found that efficiency in the plant was lowered. There had been no change in the capabilities of the executives; they were still young and still able to do a job, but they now were becoming tired, befuddled and irritable. The chief executive, at the age of 37, had noticed that in the early midportion of the afternoon he experienced acute fatigue. He began to suffer from precordial distress; he resorted to chain smoking and felt exhausted when he came home at the end of the day. His wife was struggling along with three children and no diversification in her day's work. When she would have liked a break in the monotony of her domestic life, she found that her young husband was content to sit around and recover from the fatigue of his daily efforts in the plant. This furnished a desirable escape mechanism for him. The situation was aggravated by lack of adequate social outlets, since the couple could not become too closely associated with the younger executives because of the danger that such personal relations would be detrimental to efficiency in business.

Analysis of this executive's life situations showed him to have the aggressive, dependent type of personality commonly seen among executives. The patient's mother had died when he was 9 years of age, and he had been passed from one relative to another until his father remarried two years later. He had been a football player and had subsequently married, had three children and become successful, rising to be executive director of a plant employing 400 workers. The onset of his complaint coincided with the development of a fatigue syndrome in his wife, who was distinctly bored and unhappy with life in a small town and who complained bitterly of the lack of social and intellectual diversion.

What does all this add up to? On the one hand, the business of the plant was conducted more efficiently and production costs were lower than in its previous location. On the other hand, at the end of five years its top executives were distinctly bored and tired and sooner or later became inefficient. Of course management and business must get a fair return on their capital investments or they will not be able to enlarge, modernize or expand their plants. But business should realize that highly developed, highly skilled workers must have some chance for diversion in their life outside the plant. This may mean that management may not profitably locate plants in areas where the labor market is good if the price they have to pay is a breakdown in the efficiency of their top executives.

SURVEY OF CORPORATIONS

For comparison with the group of executive patients, we studied 55 executives under the age of 50 who were referred to us by corporations for prophylactic examination. These were subjected to a routine check-up consisting of a careful history of any complaints, previous illnesses, the last time a complete medical examination was made and any facts pertinent to an accurate inventory of any patient. A complete physical examination was made, and deviations from normal were noted. This was supported by the following laboratory tests: Urine and stool analyses, complete serologic study, blood counts with differential, electrocardiogram, 2 meter roentgenogram of the chest to determine the exact size of the heart and condition of the lungs and determination of the basal metabolic rate. After the completion of this routine investigation, each person was interviewed at length, and a life survey was made for pertinent facts leading up to the present job situation. This included questions on early childhood, family environment, education, jobs previously held and reasons for leaving, marital status, home life, home environment, frequency and length of vacations, use of leisure hours, avocation and present position. The study included the subject's relations to superiors, equals and those for whose productivity he was responsible, the number of employees under his supervision and his attitude toward these employees.

Emotional Status.—We were particularly interested in evaluating emotional status in the relationships of the subject's everyday life. Early childhood patterns of many of these persons were found to be factors in the later development of insecurities, which were prevalent and which interfered with their efficiency.

The average businessman, if he is in apparently good health, does not go to a physician of his own volition. Twenty-eight of 55 of the executives included in this study had not had a physical examination within the preceding two years. The predominant reason appears to be that everyone thinks his or her organs are superior, although he knows less about the workings of the human body than he does about an automobile. He does not

take into consideration the fact that, although one can get new parts for an automobile, no new parts have been developed for the human machine at the present writing. The intelligent person who has an automobile will take that machine into a service station every one or two thousand miles to have it oiled, greased and checked, but he does not give equivalent care to his own body.

It is apparent that industry has a real stake in the management group, in which it has made a large investment. Moreover, the efficiency of workers is definitely related to the physical and emotional stability of their immediate superiors. Yet how many corporations and companies insist on periodic medical examinations for their executives? Review of the literature reveals that only a small percentage of corporations insist on and provide facilities for periodic medical examinations of their management group.

The executive who knows his job well should be able to work with the ease and precision of a well oiled machine. But the executive who has the ability and is disturbed by some emotional factor finds his efficiency definitely impaired and usually resorts to artificial stimulants to whip up his system; thereby he drives his body beyond the limits of its factors of safety. In the human body the factors of safety are no different from those of steel, wood or any other structural material. A certain load can be tolerated, but beyond the limits of stress the compensatory mechanism no longer functions and the body begins to show wear and tear. A man aged 40 or 50 therefore may find himself in the physiological group of men aged 60 or 70.

Physical Observations.—This survey revealed that 29.1 per cent (fig. 4) of the group had hypertension and 27.4 per cent obesity; electrocardiograms were abnormal in 12.7 per cent and on the borderline in 10.9 per cent. Of the whole group, only 5.4 per cent were considered entirely normal, without any physical defects. These figures compared favorably with those of Lutz,[5] who reported abnormality in 82 per cent of his group of executives. Our survey revealed two important facts: first, the lack of adequate medical study prior to this study, and second, the high incidence of asymptomatic organic disease. Lutz [5] reported also that in 41 of 55 patients with diseases of the cardiovascular system there were no symptoms. Fatigue in our referred group was noted in 10.9 per cent as contrasted with 60 per cent in the patient group. Similar surveys in the literature have not emphasized the factor of fatigue.

ETIOLOGICAL FACTORS

It is our observation that the person whose occupation is largely sedentary and primarily mental usually does not have good eating habits. Many an executive will rush to work without an adequate breakfast, although he is in a field of endeavor in which food is of paramount importance because he is using his brain constantly. Breakfast is one of the most important meals of the day because in the morning most persons have fasted for 12 or 14 hours and because physiological studies have shown only enough dextrose reserve in the body for 12 hours. The executive may find that he becomes a little tired and irritable in the midmorning because of lack of adequate food. His luncheon should be well balanced and not hurried. Frequently in the middle of the afternoon he will find himself growing more irritable, and by 4:00 or 5:00 o'clock he again is tired and restless, and his efficiency is definitely impaired, probably because his luncheon was inadequate. We have previously reported on the relation of fatigue states to accidents, and it has been clearly shown that frequent feedings are necessary for their prevention.

Another factor enters into the picture at this stage. Many an executive becomes a chain smoker because the primary effect of tobacco on the carbohydrate-regulating mechanism is to raise the blood sugar level. Unfortunately, excessive use of tobacco has a secondary effect: it depletes the blood sugar level and causes relative hypoglycemia. This is the reason why chain smokers frequently feel faint and giddy, sometimes even having cold sweats and syncopal attacks. As a rule a chain smoker is irritable, shows evidence of high tension and suffers from wear and tear on the heart muscle not only as an effect of increased tension on the coronary circulation but because the myocardium requires a normal amount of circulating dextrose for its maintenance.

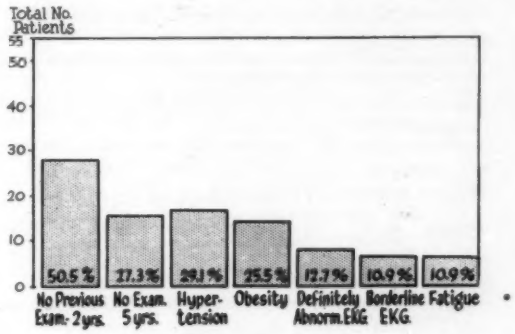

Fig. 4.—Prophylactic corporation survey.

Habein [6] noted that 62 per cent of executives smoke more than a package of cigarets a day, 27 per cent two packages and 21 per cent more than two packages. Raymond Pearl,[7] one of the world's greatest authorities on longevity, has noted that one of five heavy smokers between the ages of 30 and 50 dies before his time.

Finally, at the end of the day, the executive goes to the nearest bar and sits down for several drinks. The sense of well-being that follows a cocktail hour is due to the fact that alcohol tends to stabilize the emotional household by removing cortical inhibitory influences.

TREATMENT

The philosophical approach to the treatment of exhausted executives would naturally entail the eradication of factors which brought on and magnified the fatigue states. Dietary and pharmacologic measures have been employed to normalize the disturbed carbohydrate metabolism. The accompanying diet (table 2) is therefore suggested for patients with uncomplicated fatigue.

To stabilize the disordered carbohydrate metabolism of the exhausted patient, we have used atropine and phenobarbital in suitable doses throughout the 24-hour period, to reduce the effect of parasympathetic stimulation on the islet cells of the pancreas.

5. Lutz, E. F.: Health Examination of Industrial Executives, Indust. Med. 17: 65-69 (Feb.) 1948.

6. Habein, cited by Alvarez, W. C., in Medical Care of Executives, Illinois M. J. 83: 4 (April) 1943.

7. Pearl, R., cited by Alvarez, W. C., in Medical Care of Executives, Illinois M. J. 83: 4 (April) 1943.

Since the manifestation of fatigue is in part a psychosomatic problem, one wonders whether affected executives should be treated by psychiatrists or whether their problems may be superficial enough to be handled by their personal physician. If the physician is well enough informed on psychiatric problems, he may point out to the patient the factors which produce the disability, but if the emotional picture is complex and the patient is exceedingly disturbed, a dynamically oriented psychiatrist should be consulted. Many business organizations now hire psychologists as either personnel advisors or industrial psychologists. This is a good form of industrial hygiene.

SUMMARY

Fifty business executives under 50 years of age who sought medical care for various reasons and 55 similar subjects referred by their employers for routine check-up have been compared as to physical condition, laboratory observations, roentgenologic evidence of abnormality and emotional status.

TABLE 2.—*Suggested Diet for Fatigued Executive*

Foods to include daily:	
Cereal and bread	Whole grain or enriched, four servings or more
Meat, poultry or fish	Two servings or more
Eggs	At least three a week
Vegetables	At least two servings a day; one serving or more should be of a green or yellow vegetable
Potatoes	One serving or more
Fruits	At least two servings; one serving should be of citrus fruit or melon; the syrup of canned fruits should be avoided
Milk	One pint or more
Water	Six to eight glasses, which may include coffee and tea
Desserts	Fruit as specified, simple puddings, fruit gelatin, simple cakes (sponge or pound cake without icing), simple cookies
Fats	As needed and desired
Foods to avoid: Sugar, candy, pie, pastries, jelly, honey, jam, syrup, alcoholic and carbonated beverages	

Sample Menu

Breakfast	Luncheon	Dinner
Orange juice	Tomato juice	Chicken broth, rice
Oatmeal	Broiled lake trout	Broiled lamb chops
Poached egg	Asparagus	Baked potato
Toast	Combination salad with dressing	Julienne carrots
Butter	Bread	Perfection salad
Coffee	Fruit cup	Bread
No sugar	Butter	Butter
	Tea or coffee	Baked custard
	No sugar	Tea or coffee
		No sugar

10 a. m. Milk, 6 oz. 3 p. m. Milk, 6 oz.
Bedtime Milk, 6 oz.; crackers, cereal or toast; fruit

Note: The patient may smoke after meals but never on an empty stomach.

Fatigue was one of the outstanding complaints in the group of patients studied. It is often related to a disturbance of carbohydrate metabolism and to faulty dietary habits.

Life situations play an important role leading to exhaustion in executives. A dietary and pharmacologic approach to the therapy of exhaustion has been suggested. The role of alcohol and tobacco has been discussed.

CONCLUSIONS

We present evidence to show that executives do become exhausted. Frequently organic disease may progress unnoticed. The stress and strain of superimposed emotional factors on well balanced organic defects give rise to symptoms which cause the patient to seek medical care.

Industry should insist on periodic health examinations of executive personnel, since asymptomatic organic illness often is disclosed by prophylactic examination. Management also must recognize the need for psychological and psychiatric counseling in guarding the well-being of its executive talent for long term efficiency.

Physicians must approach the problem of disturbed physiological balance with sympathy and understanding. Fatigued patients should not be dismissed with a diagnosis of "functional disease." If the common sense of the family physician of the past is combined with the scientific knowledge of today's laboratory trained physician, it may help to solve some of the problems which confront industry.

104 South Michigan Avenue.

ABSTRACT OF DISCUSSION

DR W. P. SHEPARD, San Francisco: To my knowledge this is the first time that we have had pointed out the fatigue syndrome in this type of person. Whether or not we are dealing with a new clinical entity, it certainly is complicated and will need much more investigation. I should like to see a comparison of the occurrence of these symptoms among nonexecutives. I should like to see whether the leaders, foremen and major subordinates may show about the same type of clinical complex, or whether it occurs solely among major executives. Recently there have been studies made of the effect of different company practices on the strain resulting on all employees, including the executives. Among these, Dr. Sawyer has published an interesting summary of vacation practices. We do not know what it is that brings a man to the breakdown point. Although every mechanism, including the human, has a breaking point, it isn't safe to experiment with the human mechanism. Probably we got more data on this subject from the military during the war than any other one place, and we are seeing much the same type of thing in the young executive. We need to have a better way of calibrating man's ability to withstand stress. I hope that this is the start of larger group studies of this kind and that we will eventually have more data on this problem.

DR. SIDNEY A. PORTIS, Chicago: Fatigue is a pleomorphous symptom. Not only is it associated psychologically with factors of security, but for the most part it is seen in persons who suffer from boredom, who lose their zest and enthusiasm. It may develop in unpleasant social situations. It may develop because of the mere thought of doing certain types of work. The average person who is enthusiastic seldom feels tired. In an emergency situation, a person can undergo an unusual emotional strain and expend an unbelievable amount of energy without feeling correspondingly tired. In practically every patient who has a disturbed dextrose metabolism associated with fatigue, as a rule the three hour blood level is below the fasting level, and in many instances there may be a difference as great as 30 mg. per 100 cc. In the series of patients reported in this paper, the average curves were distinctly lower than those seen in a large group of persons previously reported as relatively normal. One can subject a normal person to boredom, and his blood sugar level may drop 10 to 15 mg. per 100 cc. while he is under the influence of that boredom. This observation had been made and reported by previous workers. These exhausted business men were given some insight into their life situations, were put on a suitable diet and were given medicaments as needed, to the end that they did a better job, were more efficient, were happier and, what is more important, lost their fatigue. It is important to have a philosophical approach to this whole problem. These business executives are tired, but this tiredness is not entirely dependent on organic disease. We must recognize that life situations, both within and without business, play an important role. The fatigued executives come to us for help. We must approach their problem with an open mind. Nobody wants to be ill. Nobody is sick unless there is a cause, whether it be functional or organic. Whatever the basis, it is our job as physicians to rehabilitate this group of young business executives in order that they do not lose their efficiency too early in life.

BEDSIDE MANAGEMENT OF PROBLEMS OF FLUID BALANCE

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and
EDWARD H. RYNEARSON, M.D.
Rochester, Minn.

It is our purpose in this paper to describe a practical clinical routine for the accurate determination of water and chloride balance and to demonstrate how such balance data may be employed to determine water and electrolyte dosage in difficult problems of fluid balance.

It is critically important to attempt to maintain normal water and electrolyte balance in severely ill patients. Yet this is often difficult to accomplish in patients with a lowered cardiorenal reserve, acute infection, oliguria, prolonged severe illness or large losses of bowel fluid. In this paper we are concerned with the difficult problem of determining daily salt (sodium chloride) and water requirements in these complicated conditions. The management of such patients is difficult because the usual criteria for determining salt and water needs that may be satisfactory in the routine case are often inadequate when complications are present. There are three reasons for this:

1. Determinations of the concentration of plasma sodium, chloride and bicarbonate are of limited value as a basis for planning fluid and electrolyte therapy because they can be misleading.[1] For example, a patient may be grossly edematous and therefore have too much salt in his body but at the same time have normal concentrations of plasma electrolytes.

2. The most commonly used criteria of salt and water needs are the clinical signs and symptoms of electrolyte imbalance. Though helpful when present, they are inadequate because they are insensitive. Stewart and Rourke[2] have shown that a normal subject may retain 700 milliequivalents of extra sodium chloride without becoming detectably edematous. Yet edema is about the only available clinical sign of sodium chloride overdosage. Others have found that a normal subject may lose 600 milliequivalents of sodium chloride before depletion of electrolytes becomes detectable by clinical observation.[3] Thus the total body content of sodium chloride can fluctuate over a range of as much as 1,300 milliequivalents without its being apparent clinically. Fluctuations of this magnitude might be harmful to severely ill patients.

3. Serial determinations of body weight, a sensitive index of fluctuations in total body water, give no direct information about changes in the amount of sodium and chloride in the body because large fluctuations in the amount of intracellular water also occur.[4] What is more important, it is often impractical to weigh severely ill patients, especially if they are in the postoperative period.

There is, therefore, a need for more exact methods of determining the daily requirements of water and electrolyte in patients with complicated problems of fluid balance. To meet this need a new approach to the clinical management of parenteral fluid therapy has been devised. This approach is based on the accurate measurement of the intake and output of chloride. The aim of parenteral salt and water therapy is to maintain the total amount of salt and water in the body at a normal or desirable level. Since this level will be maintained if the intake of water and salt equals the output, an accurate measurement of the output of these substances can be used as a basis for planning intake. Furthermore, the difference between the intake and output of chloride—that is, the chloride balance—is an absolute measure of changes in the total body chloride. Therefore the chloride balance is a reasonable basis for detecting fluctuations in the amount of salt in the body that are not detectable by the other methods previously mentioned. Because of this, the determination of chloride balance has been used as a tool in the clinical investigation of electrolyte metabolism.[5]

The application of chloride balance technics to the clinical management of problems of fluid balance has not been practical in the past because of the expense and technical difficulties of obtaining chemical determinations. However, a new method for the rapid, accurate determination of chloride at the bedside makes the measurement of chloride balance a practical clinical procedure.[6] The method is based on the direct titration of the chloride with mercuric nitrate. The end point is a sharp purple color that is easily seen. Reagents are stored in small bottles which are taped together to form a portable test set. Solutions are measured with tuberculin syringes which fit into the caps of the bottles. Results of determinations are read directly from the scale of the syringe and are available within about a minute after specimens are obtained. Duplicate determinations on plasma agree within plus or minus 1 per cent. Nearly comparable accuracy is possible on other fluids, such as urine or liquid stool. Results obtained by the bedside method compare favorably with those obtained by standard chloride methods. The accuracy of the determination may be checked at any time, since a bottle of standard salt solution is included in the test set.

METHOD FOR DETERMINATION OF WATER-CHLORIDE BALANCE

Accurate determination of the intake and output of water is often difficult and sometimes discouraging. The fact that the chloride balance can now be determined simply, provided the intake is known and the specimens of excreta are accurately saved, creates a new need for a practical hospital routine for obtaining accurate data on intake and output. A routine has been evolved that seems to meet this need. The routine is a definite departure from the usual nursing procedure of collecting, measuring, discarding and recording of each specimen. Rather, all excreta are saved by the nurses in labeled containers and are later measured and analyzed for chloride at the bedside by the physician or other person conducting the study. The routine also provides a double check on the determination of water and chloride intake.

The reliability and usefulness of the balance data obtained by this routine will, of course, depend directly on the completeness of collections of specimens and the accuracy of charting

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2. Stewart, J. D., and Rourke, G. M.: The Effects of Large Intravenous Infusions on Body Fluid, J. Clin. Investigation **21**: 197-205 (March) 1942.

3. (*a*) Marriott, H. L.: Water and Salt Depletion, Springfield, Illinois, Charles C Thomas, Publisher, 1950. (*b*) McCance, R. A.: Experimental Sodium Chloride Deficiency in Man, Proc. Roy. Soc., London, s. B. **119**: 245-268 (Feb. 1) 1936. (*c*) Van Slyke, K. K., and Evans, E. I.: The Significance of Urine Chloride Determination in the Detection and Treatment of Dehydration with Salt Depletion, Ann. Surg. **128**: 391-405 (Sept.) 1948.

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6. (*a*) Scribner, B. H.: Bedside Determination of Chloride: A Method for Plasma, Urine and Other Fluids and Its Application to Fluid Balance Problems, Proc. Staff Meet., Mayo Clin. **25**: 209-218 (April 26) 1950. (*b*) Since a description of the bedside chloride method was published, it has been found advisable, when making up the mercury reagent, to use double the quantities of concentrated nitric acid originally suggested.

of intake by the nurses. The importance of their part in the study should be emphasized by pointing out that the treatment and therefore the welfare of the patient depend directly on the reliability of their work. It also can be emphasized that this nursing routine involves less work than does the old method of determining intake and output.

The routine will work only if there is close cooperation between the nursing staff and the person conducting the study. The duties of each should be clearly delegated; the nurses should be carefully coached and given a written summary of their duties.

Duties of the Nursing Staff.—1. All excreta are saved in clearly marked containers[7] which are supplied by the person conducting the study. Since that person will measure the specimens, the nurses are relieved of the unpleasant task of charting and totaling outputs. To insure that all specimens are saved it is helpful to affix a sign over the patient's toilet directing that nothing be discarded.

A fluid balance technician is shown analyzing a specimen of gastric fluid for chloride. She is in the process of completing a water-chloride balance sheet on this patient. The cart is used to transport containers. It also serves as a place to work.

2. If specimens are lost either through incontinence or by being discarded by mistake, the nurse must make an estimate of the volume of fluid lost and note it on the record. Although such estimates are rough, they have proved sufficiently accurate to be used to complete the balance study. However, losses through incontinence must be kept at a minimum if the data are to be reliable, and every precaution should be used to avoid such losses. Uretheral catheters should be used for patients with urinary incontinence. Collection cups, continuous suction devices and tubes can be employed to make collections from gastrointestinal fistulas fairly complete.

3. Frequent notations on the amount of visible perspiration should be made. If the bedclothes are changed because of sweating this should be noted. These notes form the basis for the estimate of insensible loss.

4. Complete charting of the type and amount of all parenterally administered fluids is essential. As a double check, all empty parenteral fluid bottles are saved to be checked later by the person doing the balance study.

5. The nurses should keep as accurate an account as possible of oral intake of fluid and food. A graduated cup or glass aids in determining the oral intake of fluids. The help of the patient or his relative should be enlisted in keeping an accurate account of oral intake.

6. Fluid used to irrigate suction tubes may be taken from a graduated liter bottle supplied and refilled by the person conducting the study. This obviates charting of irrigation volumes by the nurses. Irrigation returns are simply mixed with the other aspirate.

Duties of the Fluid Balance Technician.—The person conducting the study who supplies the containers and completes the determination of water-chloride balance is known as the fluid balance technician. In small hospitals where there is only an occasional patient requiring such studies, the physician or intern may himself act as the fluid balance technician. In larger hospitals it may be advisable to organize a hospital fluid balance service and train a person, preferably a nurse, to be a fluid balance technician. This is not difficult because the bedside chloride test used to analyze the specimens is simple and requires no prior knowledge of chemistry. Nurses so trained have capably carried out the duties of the fluid balance technician in the hospitals in Rochester, Minn. In one 1,000 bed. hospital where perhaps 100 major surgical procedures a week are done, the number of patients on the fluid balance service averages 15 to 20 at any one time. The fluid balance technician, using a hospital cart as a table, (see the illustration) visits each of these patients each day and performs the following duties:

1. The technician accurately measures the volume of all excreta that have been saved. Each specimen is then analyzed for chloride by the bedside method[6a] and for p_H by the use of indicator paper.[8] Results are assembled, calculated and then recorded on a form such as that shown in table 1. This form is known as a water-chloride balance sheet. The total chloride output is calculated by multiplying[9] the concentration of chloride in the specimen by the total volume.

2. The technician totals and enters in the output column an estimate of all losses through spillage and incontinence as determined from the nurses' notes. An example of such an estimate is the "Estimated urine lost" entry in table 1. For the purpose of calculation, the chloride concentration and the p_H of the specimen lost are assumed to be the same as those of the specimen saved and analyzed.

3. Insensible and sensible losses of water and chloride are estimated on the basis of the amount of visible perspiration as noted in the nurses' notes and as determined by questioning the patient. The estimates are made according to the schedule shown in table 2. This schedule has been drawn up tentatively and is based on the literature[10] and on limited experience in the estimation of insensible loss from serial weighings of the patient.[11] The values for chloride in sweat are based on the data of McCance[12] and others.[13] They are intended only as approximations, since the chloride content of sweat varies widely; the chloride estimates are, if anything, too high, especially in the case of patients who are acclimatized to a hot environment.

We have had no experience with the determination of sensible and insensible loss at high environmental temperatures. Under such conditions our schedule may have to be revised upward because, in dry climates especially, a patient may sweat continually without its being apparent to him or his nurse. Wiley and Newburgh[14] estimate that when the environmental

7. A dropperful of formaldehyde U. S. P. added to each container helps reduce the odor and preserve the p_H of the specimen.

8. A good indicator paper for this purpose is Accutint-Wide Range B, made by Anachemia Ltd., Montreal, Canada.

9. Learning to do the multiplication on a 50 cent plastic slide rule is easy and worth the slight effort involved, because so much time is saved in completing the calculations.

10. Adolph, E. F.: Physiological Regulations, Lancaster, Pa., Cattell & Co., Ltd., 1943, p. 100. Mariott.[2a]

11. Newburgh, L. H.; Johnston, M. W., and Newburgh, J. D.: Some Fundamental Principles of Metabolism, ed. 2, Ann Arbor, Mich., Edwards Brothers, Inc., 1945.

12. McCance, R. A.: The Effect of Salt Deficiency in Man on the Volume of the Extracellular Fluids, and on the Composition of Sweat, Saliva, Gastric Juice and Cerebrospinal Fluid, J. Physiol. **92**: 208-218 (March) 1938.

13. Freyberg, R. H., and Grant, R. L.: Loss of Minerals Through the Skin of Normal Humans when Sweating Is Avoided, J. Clin. Investigation **16**: 729-731 (Sept.) 1937.

14. Wiley, F. H., and Newburgh, L. H.: The Relationship Between the Environment and the Basal Insensible Loss of Weight, J. Clin. Investigation **10**: 689-701 (Oct.) 1931.

temperature is above 30 C. the insensible loss of an average man may increase about 500 ml. of fluid per twenty-four hours for every 1 degree Centigrade rise in environmental temperature.

The insensible loss actually may be determined by using water balance data and daily weights.[11] Sometimes a gross underestimate of the insensible loss can be detected from the balance sheet if it shows an unexplained water retention in the presence of a normal volume of urine.

4. Parenteral intake of water and chloride is determined by comparing the nurses' notes with the labels on the empty parenteral fluid bottles that have been saved. The volume, type of fluid and chloride content, including added salts such as potassium chloride, are recorded in the intake column of the balance sheet.

5. The oral intake of water is determined from the nurses' notes. By assuming that food is 100 per cent water, the calculation is simplified. The error introduced by this assumption is small and is usually roughly canceled by the daily water of oxidation, which is also neglected.

6. If it is desired that chloride balance be studied on patients getting a large part of their intake by mouth, it is possible to estimate with sufficient accuracy the oral intake of chloride. Simple broths and tube-feeding formulas may be analyzed directly by the bedside method.[6a] The chloride content of food can be obtained from dietary tables or, if salt is added in cooking, from the dietitian. Salt added by the patient may be determined by having him use a salt shaker made from a Sanford-Magath hematocrit tube. (A perforated paper held over the end with a rubber band converts such a tube to a satisfactory salt shaker.) By weighing the amount of salt in a tube, the number of milliequivalents of chloride that is represented by each division on the scale of the tube may be determined. For common table salt this figure averages about 2.2 milliequivalents per division. By noting the number of divisions the level of the salt falls each day, the number of milliequivalents of chloride used by the patient is determined easily. Although such methods are crude they have proved accurate enough in practice to yield satisfactory results when the chloride balance of normal patients eating a full diet was determined.

7. The time interval covered by the data in the balance sheet should be indicated at the top of the form as shown in table 1.

8. When possible, the fluid balance technician should weigh the patient daily. A portable bathroom scale calibrated in kilograms may be used. This can be carried right on the cart.

9. When all the items in the intake and output columns have been recorded, the columns are totaled and the balances calculated.

As shown in table 1, the daily balances of water and chloride are simply the differences between the intake and the output. The cumulative chloride balance is the sum of the daily chloride balances and represents the net gain or loss of chloride by the patient since the beginning of the study. In table 1, for example, the cumulative chloride balance on Feb. 6, 1950 is determined by adding the daily balance, plus 217, to the previous cumulative balance, minus 21 milliequivalents, which gives a result of plus 196 milliequivalents. This means that the total amount of chloride in the patient's body is 196 milliequivalents more than on the day the study was started.

When the detection of fluctuations in total body water is important, as in the management of acute renal shutdown, the cumulative water balance may be calculated. However, serial determination of body weight is a more reliable measure of fluctuations of total body water and therefore should be done whenever possible.

Cost and Accuracy of Water-Chloride Balance Studies.—It takes on the average about one-half hour per patient per day for the fluid balance technician to complete a water-chloride balance study. If the study is done by a regular technician working part time or full time on a hospital fluid balance service, the information can be supplied at an actual cost of about $1 to $2 per patient per day depending on the number of patients being studied. Water-chloride balance studies often more than pay for themselves by reducing the number of plasma electrolyte studies.

In the absence of excessive incontinence and continuous sweating, water-chloride balance studies obtained in the manner outlined are surprisingly accurate. We have followed the balances of patients for as long as a month or six weeks with a cumulative error in chloride balance of less than plus or minus 50 milliequivalents per week. When patients are getting a full oral intake, the accuracy is probably about plus or minus 100 milliequivalents per week. If the patients become grossly incontinent, the accuracy may be so low that the study becomes of little value. The accuracy of the chloride balance is due in part to the fact that in the type of patient studied errors made in the estimation of oral intake and insensible loss affect the calculation of chloride balance relatively little.

TABLE 1.—*Water-Chloride Balance Sheet**

From: 8:00 a. m. Feb. 5, 1950. To: 10:00 a. m. Feb. 6, 1950. Equals: 26 hr.

Intake			Output				
					Chloride, mEq.†		
Volume, Ml.	Fluid	Chloride, mEq.†	Volume, Ml.	Fluid	Per Liter	Total	p_H
1,100	Oral	21	1,150	Urine	35	40	6.0
2,000	5% dextrose in water	...	1,000	Insensible	..	0	...
3,000	5% dextrose in normal saline	450‡	2,840	Gastric (aspirated)	74	210	6.5
			100	Estimated urine lost	35	4	6.0
			100	Formed stool	..	0§	...
6,100	Totals	471	5,190	Totals	..	254	...

Daily balance: Water: + 910 ml. Chloride: + 217 mEq. Cumulative chloride balance: + 196 mEq.

* At the beginning of the period on Feb. 5, 1950 the plasma bicarbonate measured 29 milliequivalents per liter, and the plasma chloride measured 98 milliequivalents per liter; the cumulative chloride balance was minus 21 milliequivalents.

† It has been found that the chloride data are most useful when expressed in milliequivalents because this facilitates the indirect estimation of sodium balance (100 milliequivalents of chloride equals 5.85 Gm. of chloride as sodium chloride or 3.46 Gm. of chlorine). However, if one prefers to express chloride as grams of sodium chloride or grams of chlorine, the bedside chloride test can be adjusted to provide results directly in any of these units of measure.[6a]

‡ It has been found that 150 milliequivalents per liter is a satisfactory figure to employ in calculating the chloride in 0.9 per cent saline solution or similar solutions. If the amount of chloride in a solution is unknown, it may be determined directly by analysis using the bedside method.[6a]

§ The amount of chloride in formed stool is so low that it can be ignored.

TABLE 2.—*Schedule for Estimating the Insensible and Sensible Loss of Water and Chloride*

Amount of Sweating	Water and Chloride Lost in 24 Hr.	
	Water, Ml.	Chloride, mEq.
No fever and no sweating	1,000	0
High fever or moderate sweating	1,500	35
Severe sweating (enough to necessitate change of pajamas)	2,000	70
Repeated severe sweating	Higher volumes of water and 70 mEq. of chloride for every 1,000 ml. in excess of the first 1,000 ml.	

MAINTAINING NORMAL WATER AND ELECTROLYTE BALANCE

For reasons to be discussed, it is far simpler to use water-chloride balance data as a basis for maintaining normal fluid balance than for correcting disturbances of fluid balance. Therefore it is important to start a balance study before trouble develops—i. e., on the day of operation for any patient who might be prone to have postoperative complications. To maintain normal water and electrolyte balance in a patient who is normal at the start of treatment, one plans to give the equivalent of the anticipated loss and at the same time to correct the previous day's imbalances.

Anticipating Losses.—Urinary Loss: An allowance of 1,500 ml. of water and 50 milliequivalents of chloride is made for urinary output. These amounts are chosen to provide the kidney with an opportunity to excrete waste products efficiently [15] and to help maintain electrolyte balance. Furthermore, such allowances enable the kidney to correct mistakes that may be made in anticipating other losses. For example, if 500 ml. too little water is allowed for insensible loss, the kidney can correct this error by decreasing the volume of urine from 1,500 to 1,000 ml. without impairing its efficiency.

These allowances for urinary output often have to be modified in the individual case. For example, one would not provide for a urinary output of 1,500 ml. in a case of anuria due to renal shutdown but in another case it might be necessary to allow for higher values than 50 milliequivalents of chloride if the kidneys could not conserve salt.

Insensible Loss: Water and chloride losses are anticipated on the basis of the schedule given in table 2.

Gastrointestinal Losses: By noting the volume of the gastrointestinal fluid lost during the preceding period, one can estimate roughly the volume that will be lost during the next period. For example, if the water-chloride balance sheet indicates that 1,000 ml. of gastric fluid containing 90 milliequivalents of chloride was aspirated during a 12 hour period, one can then estimate that roughly 2,000 ml. of gastric fluid and 180 milliequivalents of chloride will be lost during the succeeding 24-hour period. Such estimates are only tentative, and treatment that is based on them should be revised if the output changes during the period.

The anticipated losses of water and chloride are then totaled. This total represents approximately the amount that should be given in order to keep up with the losses and thereby maintain the status quo. However, it is not necessarily the amount that should actually be given; the previous day's imbalances also must be corrected.

Planning Treatment for the Next Period.—Amount of Water: The general principle consists of noting the volume of the anticipated loss and then planning to give this amount or more, depending on whether or not the patient has a water deficit at the beginning of the period. The presence or absence of a water deficit may usually be determined by noting the presence or absence of thirst and the volume of urine.[9a] It should be noted that the figure for daily water balance is not used as a basis for determining water dosage except in cases of renal shutdown.

Amount of Sodium Chloride: Except as will be noted below in the discussion of acid balance and of sodium balance, the sodium balance is assumed to parallel roughly the chloride balance. Therefore, most losses of chloride are replaced with sodium chloride.

Thirst and oliguria give early warning of disturbances of water balance. Because there are no comparable early signs of sodium chloride imbalance, the amount of sodium chloride in the body can fluctuate through a range of several hundred milliequavalents without its being apparent clinically, as has already been demonstrated. Since the cumulative chloride balance is a measure of changes in the total amount of sodium and chloride in the body and therefore of these very fluctuations, it is used to help determine how much sodium chloride should be given.

The general principle of planning the amount of sodium chloride to give consists of noting the anticipated loss and then planning to give this amount and more or less, depending on the cumulative chloride balance. If the cumulative chloride balance shows a retention of chloride relative to the amount present at the start of treatment when the patient was normal, then less than the anticipated loss of chloride should be given. If the cumulative chloride balance shows a loss, then more than the anticipated loss of chloride should be given. The following case illustrates how normal water and electrolyte balance may be maintained in a patient who is normal at the start of treatment.

A man aged 64 with a chronic duodenal ulcer and hypertension had a partial gastric resection on Feb. 2, 1950. A water-chloride balance study was started on the day of operation because the patient had a lowered cardiac reserve as a result of hypertensive heart disease. The patient was eating a full diet prior to operation and was therefore considered to be in normal balance with respect to water and electrolytes.

His postoperative course was essentially uneventful until February 5, the third postoperative day. About noon on that day he began to have abdominal distention and had to have repeated gastric aspirations. The water-chloride balance sheet for that period and the pertinent blood analyses are shown in table 1. The procedure for planning treatment for the next 24 hours, that is, from 10:00 a. m. February 6 to 10:00 a. m. February 7, was as follows:

1. It was anticipated that 1,500 ml. of water and 50 milliequivalents of chloride would be lost in the urine.

2. Since sweating or fever was not anticipated, an allowance of 1,000 ml. of water and no chloride was made for insensible loss.

3. Since 2,840 ml. of fluid containing 210 milliequivalents of chloride was aspirated from the bowel during the preceding 26 hours, it was estimated that roughly 2,500 ml. of fluid containing approximately 185 milliequivalents of chloride would be aspirated during the next 24 hours.

4. Then, by addition, the total anticipated loss was determined to be 5,000 ml. of fluid and 235 milliequivalents of chloride.

5. Since there was absence of thirst on February 6, and since the urinary volume was 1,150 ml. for the preceding 26 hours, it was concluded that a water deficit did not exist. Therefore, a reasonable amount of fluid for the next 24 hours would be 5 liters, the anticipated loss. The amount of sodium chloride this fluid should contain was determined as follows:

6. Since the anticipated loss of chloride was 235 milliequivalents and since the patient had 196 milliequivalents more of chloride in his body than he had on the day of operation when he was presumed to have a normal amount, the administration of only 39 milliequivalents of chloride (235 minus 196) was indicated to restore the total chloride in the body to normal. This amounted to just 260 ml. of 5 per cent dextrose in normal saline solution. Practically, the amount was so small that sodium chloride was not given during the next period. The planned intake, therefore, consisted of 5 liters of dextrose in distilled water, without the addition of salt. It should be

15. Gamble, J. L.: Chemical Anatomy, Physiology and Pathology of Extracellular Fluid: A Lecture Syllabus, ed. 5, Cambridge, Mass., Harvard University Press, 1947, charts 49 and 17-F.

remembered in this connection that the accumulation of chloride in the body is undesirable for any postoperative patient, especially if the cardiac reserve is lowered.[16]

The plan in the foregoing case was tentative and was subject to modification by changes in output during the period, such as might occur as a result of increased sweating or cessation of gastric aspiration.

Errors in Planning Treatment.—Because the volume of urine and the cumulative chloride balance are exceedingly sensitive indexes of water and electrolyte imbalance, early detection of errors in treatment is possible. In planning treatment from day to day one need not be overly concerned about the exact amount and type of fluid to give, as long as the previous day's imbalances are taken into account. In the case just presented, the patient probably would have had to retain 400 to 600 milliequivalents of chloride (that is, to have a cumulative chloride balance of plus 400 to plus 600 milliequivalents) before the excess could be detected clinically. Similarly, this patient would have had to lose up to 600 milliequivalents of chloride before a depletion would be evident clinically. Therefore, in planning the next day's salt intake it made little difference whether 1 liter of salt solution or no salt solution was given, just as long as the previous day's excess of plus 196 was being corrected by giving less than the anticipated output of 235 milliequivalents. By using this scheme of trying to correct the previous day's imbalances without stopping to ponder over the exact amount of salt and water to give, planning treatment from day to day is simplified and merely involves a glance at the balance sheet and a few rough mental calculations. At the same time this scheme insures that the patient's water and electrolyte balance will fluctuate much more closely around the norm than when the usual methods of planning treatment are employed. This last point is emphasized by the following:

Two postoperative patients with new ileac stomas posed difficult therapeutic problems because of large losses of bowel fluid. Both patients were studied by water-chloride balance technics, but only in the second case were the data available to the physician treating the patients. Salt and water dosage in the first case was determined by the usual methods. During a seven day period the total body salt in the first case, as measured by the cumulative chloride balance, fluctuated through a range of 1,100 milliequivalents. Only at the extremes of fluctuation was the disturbance evident clinically. During a similar difficult period of management, the body salt in the second case fluctuated through a range of less than 300 milliequivalents.

Disturbances of Acid-Base Balance.—In planning treatment to maintain normal fluid and electrolyte balance, disturbances of acid-base balance often can be anticipated by noting the p_H of the fluids being lost from the bowel. For the purpose of this discussion, a disturbance of acid-base balance is defined as a deviation from normal in the concentration of serum bicarbonate. Only disturbances caused by loss of gastrointestinal fluid are considered here.

Disturbances of acid-base balance result when the intake and output of sodium do not parallel that of chloride. Since preliminary experience indicates that the amount of sodium in a specimen of fluid from the bowel can be estimated roughly from the amount of chloride in that specimen if the p_H is known also, one often can tell from the balance sheet alone whether or not large losses of fluid from the bowel will disturb the acid-base balance. This is done on the basis of the following tentative criteria, which are founded on limited clinical experience and the analysis of 50 specimens of bowel fluid for sodium, chloride and p_H.

If the p_H of the gastrointestinal fluid lost is less than 5, enough more chloride than sodium may be lost to cause an alkalosis; if the p_H is 5 or more but less than 7, no disturbance of acid-base balance is likely to occur; and if the p_H is 7 or more, acidosis may develop, although this has been comparatively rare in our experience to date. The following case illustrates the principles of determining whether large losses of fluid from the bowel will disturb the acid-base balance:

A woman aged 40 who was being treated for a duodenal fistula had for several days received fluids only parenterally. On Dec. 7, 1949 the values for plasma electrolytes were in the normal range (table 3). On that day administration of water and a clear liquid diet was started by mouth. The water-chloride balance sheet for the first day on oral intake showed that the fluid from the duodenal fistula, which had previously been neutral, had now become extremely acid as indicated by a p_H of 1.5 (table 3). This change in p_H may have been due to the fact that the large oral intake stimulated gastric secretion and washed gastric juice down into the duodenum and out through the fistula. The p_H of 1.5 of this fluid suggested that more chloride than sodium was being lost. In this case, the sodium in the aspirated duodenal fluid was actually determined and proved to be 53 milliequivalents per liter as compared with a chloride concentration of 99 milliequivalents per liter. It was therefore reasonable to anticipate that an alkalosis might develop. This was confirmed by a rise in the plasma bicarbonate content to 35 milliequivalents per liter on Dec. 8, 1949 (table 3).

If a disturbance of acid-base balance is anticipated, the concentration of serum bicarbonate can easily be determined to settle the question.[17] To prevent and treat disturbances of acid-base balance, enough sodium and chloride should be given to insure spillage of these electrolytes in the urine. The kidney then can help correct the disturbance by excreting an excess of either sodium or chloride, depending on the need. The correction of

TABLE 3.—*Water-Chloride Balance Sheet in a Case in Which the Acid-Base Balance Was Disturbed**

Dec. 7, 1949: Cumulative Chloride Balance: —104 mEq. From: 9:00 a. m. Dec. 7, 1949. To: 8:00 a. m. Dec. 8, 1949. Equals: 23 hr.

Intake			Output				
					Chloride, mEq.		
Volume, Ml.	Fluid	Chloride, mEq.	Volume, Ml.	Fluid	Per Liter	Total	p_H
2,540	Oral	60	1,200	Urine	40	48	7.0
1,000	5% dextrose in normal saline	150	1,000	Insensible	..	0	...
1,000	5% dextrose in water	0	3,100	Duodenal fistula	94	307	1.5
4,540	Totals	210	5,300	Totals	..	355	...

Date: Dec. 8, 1949. Daily balance: Water: —760 ml. Chloride: —145 mEq. Cumulative chloride balance: —249 mEq.

* At the beginning of the period on Dec. 7, 1949 the plasma bicarbonate measured 29 milliequivalents per liter, and the plasma chloride measured 99 milliequivalents per liter. At the end of the period on Dec. 8, 1949 the plasma bicarbonate measured 35 milliequivalents per liter and the plasma chloride measured 89 milliequivalents per liter.

16. Coller, F. A.; Iob, V.; Vaughan, H. H.; Kalder, N. B., and Moyer, C. A.: Translocation of Fluid Produced by the Intravenous Administration of Isotonic Salt Solutions in Man Postoperatively, Ann. Surg. 122: 663-677 (Oct.) 1945.

17. Scribner, B. H.: The Bedside Determination of Bicarbonate in Serum, Proc. Staff Meet., Mayo Clin., to be published.

disturbances of acid-base balance can be hastened by varying the proportion of sodium to chloride in the replacement fluid.[18]

Sodium Balance Versus Chloride Balance.—One criticism of the proposed technic is that it is concerned with chloride balance when actually it is sodium balance that is important. This criticism may be answered as follows:

1. For the purposes of planning treatment it is assumed that sodium balance must roughly parallel chloride balance or gross disturbances of acid-base balance will occur; as we have already indicated, the proposed technic anticipates disturbances of acid-base balance. In some 300 patients no instance of electrolyte imbalance has resulted from treatment based on this assumption.

2. Although it is true that the amount of extracellular fluid in the body is determined largely by the sodium balance, chloride, like mannitol, is actually a better substance with which to measure the extracellular fluid, because chloride is more completely excluded from the cells than is sodium.[19]

RESTORING NORMAL WATER AND ELECTROLYTE BALANCE

Excluding disturbances of acid-base balance, which have already been considered, and disturbances of potassium and other intracellular ion balances, which will not be discussed in this paper, disturbances of water and electrolyte balance can be classified into four types[20]: (1) dehydration from deficit of water; (2) overhydration from excess of water; (3) dehydration from deficit of sodium chloride, and (4) overhydration from excess of sodium chloride. These disturbances are not seen often in pure form but are usually seen in combination. However, for the purpose of description they are considered separately.

Dehydration from Deficit of Water.—This condition is defined as a loss of water without an associated loss of electrolytes. The body fluids therefore become hypertonic. The condition is suggested clinically by the presence of oliguria and thirst. The deficit is treated by giving enough extra water to alleviate the thirst and to increase the volume of urine. Depletion of water should be treated with caution if the patient is also severely depleted of sodium chloride; the latter condition should be treated at the same time. It is important to exclude primary renal shutdown, such as is seen in lower nephron nephrosis, as a cause of oliguria before administration of extra water is begun. Primary renal shutdown sometimes may be excluded if there is no evident cause for it and if the history, symptoms and laboratory data (including a high urine specific gravity) support the diagnosis of depletion of water. In case of doubt, water should be given cautiously until the volume of urine increases or until it becomes apparent that the oliguria is of primary renal origin.

Overhydration from Excess of Water.—This condition is defined as a relative or absolute increase in the body water without an associated increase in body electrolyte. The body fluids therefore become hypotonic because of dilution. Water excess is relatively infrequent. It usually results from the excessive administration of water to a patient who is unable to eliminate the excess through the kidneys.[21] The severe form of water excess produces the syndrome of water intoxication.[22] Treatment consists of stopping the administration of water. This is about the only condition in which the anticipated loss of water should not be replaced. Treatment with hypertonic salt solution also has been advocated.[23]

Dehydration from Deficit of Sodium Chloride and Overhydration from Excess of Sodium Chloride.—These conditions are defined as a decrease or increase, respectively, in the total body sodium and chloride. There is usually a corresponding change in the total body water so that the concentration of sodium and chloride remain near normal and isotonicity is maintained. However, in severe depletion low levels of serum electrolyte are found. A deficit of sodium chloride is characterized clinically by mental apathy, decreased skin turgor, circulatory collapse, hemoconcentration and low concentrations of electrolyte in the plasma and urine. An excess of sodium chloride is suggested by edema.

The problem of diagnosing and treating depletion and excess of sodium chloride is often difficult because, as stated previously, the clinical and laboratory signs of sodium chloride imbalance are often misleading or insensitive. The cumulative chloride balance is helpful but only in an indirect way, because it measures only changes in the total amount of sodium and chloride in the body, rather than the absolute amount present. During treatment it is difficult to decide when the patient has attained a normal or desirable amount of sodium and chloride in his body. Of course, the easiest solution to this problem is to start with a patient who has normal water and electrolyte balance; hence the importance of starting a water-chloride balance study before trouble develops, as was done in the case depicted in table 1. In most cases, however, one is forced to begin treatment when sodium chloride balance is already greatly disturbed. A general approach to the problem of deciding when the amount of sodium and chloride in the body has been restored to a desirable level is outlined below.

1. At the start of treatment a rough preliminary estimate of the magnitude of the deficit or excess of sodium chloride is made on the basis of the history, physical examination and laboratory data. In illness of short duration comparison of the body weight at the time with the patient's normal body weight may be helpful in making this estimate. From this estimate a preliminary guess is made of the figure which represents the "desirable cumulative chloride balance." The desirable cumulative chloride balance is defined as the value for the cumulative chloride balance that exists when the total body sodium chloride is at a normal or desirable level. In other words, it is an estimate of the gain or loss of chloride that must be effected by treatment to restore the total body chloride of the patient to normal. For example, a patient is definitely but slightly edematous over the sacrum and ankles on the day a water-

18. Lockwood, J. S., and Randall, H. T.: The Place of Electrolyte Studies in Surgical Patients, Bull. New York Acad. Med. **25**: 228-243 (April) 1949.

19. Elkinton, J. R.: The Volume of Distribution of Mannitol as a Measure of the Volume of Extracellular Fluid, with a Study of the Mannitol Method, J. Clin. Investigation **26**: 1088-1097 (Nov.) 1947.

20. Gastineau, C. F.: A Classification of the Disorders of Electrolyte Metabolism, Proc. Staff Meet., Mayo Clin. **25**: 630-634 (Nov. 8) 1950.

21. Cooper, D. R.; Iob, V., and Coller, F. A.: Response to Parenteral Glucose of Normal Kidneys and of Kidneys of Postoperative Patients, Ann. Surg. **129**: 1-13 (Jan.) 1949.

22. Helwig, F. C.; Schutz, C. B., and Kuhn, H. P.: Water Intoxication; Moribund Patient Cured by Administration of Hypertonic Salt Solution, J. A. M. A. **110**: 644-645 (Feb. 26) 1938.

23. Gamble, J. L.: Chemical Anatomy, Physiology and Pathology of Extracellular Fluid; A Lecture Syllabus, ed. 5, Cambridge, Mass., Harvard University Press, 1947, chart 35-C. Peters, J. P.: Diagnostic Significance of Electrolyte Disturbances, Bull. New York Acad. Med. **25**: 749-763 (Dec.) 1949.

chloride balance study is begun. Because of the edema, one may conclude that the total amount of sodium and chloride in the body is well above normal. Since the cumulative chloride balance is always assumed to be zero at the start of a study, in this patient it will be minus several hundred milliequivalents when the amount of sodium and chloride in the body has been returned to normal. The preliminary estimate of the desirable cumulative chloride balance in such a patient might be minus 600 to minus 800 milliequivalents. (The desirable cumulative chloride balance would, of course, be zero in a patient who was normal at the start of this study.)

2. Treatment of the sodium chloride imbalance is begun by giving more or less than the anticipated loss of chloride, as the case may be. When giving more than the anticipated loss of chloride it is sometimes advisable to give more than the anticipated loss of water, because part of the retained salt will hold water with it. As treatment proceeds, an attempt is made to correlate changes in the signs and symptoms of electrolyte imbalance with changes in the total body salt as measured by the cumulative chloride balance. In this way the estimate of the desirable cumulative chloride balance can be made more accurate. For example, if a patient is being treated for a salt depletion and the obvious signs of the depletion (including poor skin turgor, hemoconcentration and low concentration of plasma electrolytes) disappear when the cumulative chloride balance reaches plus 600 milliequivalents, one can usually conclude that the desirable cumulative chloride balance is somewhere around plus 1,000 milliequivalents.

One way to help determine the desirable cumulative chloride balance is to correlate changes in the concentration of chloride in the urine with changes in the cumulative chloride balance. The concentration of chloride in the urine often falls to low levels (that is, below 35 milliequivalents per liter) with the development of only a slight deficit of sodium chloride and rises again only after the deficit has been alleviated.[3a, c] If the urinary chlorides rise from 10 to 70 milliequivalents per liter while the cumulative chloride balance rises from plus 1,100 to plus 1,200 milliequivalents, the desirable cumulative chloride balance is likely to be around plus 1,200 milliequivalents.

Data on urinary chlorides are by no means infallible, and conclusions drawn from them are valid only in the absence of contradictory evidence based on the cumulative chloride balance and over-all clinical evaluation of the electrolyte status. We have found, as have Randall, Habif and Lockwood,[24] that certain severely ill patients can have a high excretion of urinary chloride in the presence of severe salt depletion and vice versa. However, this does not mean that treatment based on the test for urinary chloride is dangerous and misleading. When interpreted as outlined above, limitations of the test are obviated and it has proved to be of great value in helping to determine the desirable cumulative chloride balance. It is hoped that on the basis of further experience with this new clinical tool, the cumulative chloride balance, new principles can be evolved that will simplify the problem of determining the desirable cumulative chloride balance in the individual case.

The fact that a value for the desirable cumulative chloride balance has been established does not mean that it should not be constantly reviewed. The main reason for review is to check on errors that might be made in determining the chloride balance and to detect abnormal accumulations of fluid. For example, suppose that peritonitis develops in a patient with a desirable cumulative chloride balance of plus 400 milliequivalents and that fluid accumulates in his peritoneal cavity. This fluid is unavailable to the body and must be replaced just as though it had been lost from the bowel. Yet this loss does not show on the balance sheet. The net result is that the estimate of the patient's desirable cumulative chloride balance will have to be increased by several hundred units, say, to plus 700 milliequivalents. The exact figure will have to be determined.

The above discussion serves to emphasize again a basic point in parenteral fluid therapy, namely, that laboratory tests are no substitute for clinical judgment. Water-chloride balance data refine and improve clinical judgment; they do not replace it.

TYPES OF CASES IN WHICH WATER-CHLORIDE BALANCE STUDIES HAVE PROVED OF PARTICULAR VALUE

A man aged 83 had postoperative gastric retention. In spite of seemingly large amounts of salt and water given parenterally, he became salt depleted and alkalotic. Water-chloride balance studies were started; these indicated that the patient should receive 8 liters of fluid and 600 milliequivalents of chloride in a 24-hour period. In spite of a lowered cardiac reserve, this amount was given slowly and carefully. The patient benefited greatly and did not show evidence of congestive heart failure. After three more days of treatment, his gastric retention was relieved and he recovered.

Giving a man 83 years of age 8 liters of fluid in one day would have seemed rather drastic had it not been for the water-chloride balance studies, which clearly indicated the need for this vigorous treatment.

A boy 8 months of age underwent ureterosigmoidostomy for exstrophy of the bladder. Thirty-six hours after operation he had generalized convulsions without apparent cause, and his condition became critical. Water-chloride balance data, which had not been available to the physician in charge, revealed that although the volume of urine had been satisfactory it had not been large enough to keep up with the rate of infusion of dextrose solution being given to maintain an adequate urinary volume. The data showed a retention of water without a retention of salt; in other words, overhydration from excess of water was causing water intoxication. Two per cent sodium chloride in 10 per cent solution of dextrose stopped the convulsions almost immediately, and the patient recovered uneventfully.

Water-chloride balance studies may have been lifesaving in this case, because the diagnosis of water intoxication would have been difficult to make without them, as evidenced by the fact that it was not made until they were available. Similarly water-chloride balance studies by demonstrating early a retention of water in the presence of oliguria have facilitated the early diagnosis of impending primary renal shutdown; such studies also facilitate better management of this difficult problem.

A boy aged 8 years had aspiration pneumonia after an emergency operation for obstruction of the bowel. Four days after operation the physician in charge consulted the fluid balance service because of a plasma bicarbonate level of 41 milliequivalents per liter, which was believed related to the continued aspiration of gastric juice. Water-chloride balance data revealed that the gastric aspirate had been neutral instead of acid and therefore could not explain the "alkalosis." The data also revealed that the high bicarbonate level with hypochloremia was due to renal excretion of an acid urine high in chloride.

24. Randall, H. T.; Habif, D. V., and Lockwood, J. S.: Sodium Deficiency in Surgical Patients and the Failure of Urine Chloride as a Guide to Parenteral Therapy, Surgery **28**: 182-207 (Aug.) 1950.

When these observations were correlated with the pneumonia, the correct diagnosis of respiratory acidosis was established. It was confirmed by a plasma p_H determination of 7.2.

This diagnosis was of more than academic interest because it prevented the giving of ammonium chloride to lower the serum bicarbonate level, which would have made the acidosis worse.

SUMMARY

The importance of maintaining normal water and electrolyte balance and the inadequacy of present methods of accomplishing this in difficult conditions suggest a need for more exact methods of planning treatment for patients with complicated problems of fluid balance.

The goal of parenteral salt and water therapy is the maintenance of total body salt and water at a desirable level. Since water-chloride balance studies accurately measure changes in this level, they provide a reasonable basis on which to plan treatment. The clinical determination of water-chloride balance may now be accomplished with acceptable accuracy and at low cost by a new technic for the accurate bedside determination of chloride. Such water-chloride balance studies have been found of value in planning water and electrolyte dosage for several reasons:

1. They inexpensively provide a factual basis on which to plan treatment based on the individual need rather than on tests, rules or formulas. At the same time, they provide early warning of errors in treatment. Better care is therefore given at lower cost.

2. Water-chloride balance studies encourage physicians to think in terms of the total amount of sodium and chloride in the body as well as in terms of the concentration of these substances in the plasma.

3. Water-chloride balance studies make the management of problems of fluid balance more interesting and instructive and provide an excellent basis for teaching the principles of water and electrolyte metabolism.

4. Because nurses soon realize that the patient's welfare often depends on the reliability of their charting, the nursing staff is stimulated to be more accurate and precise in their recording of data on intake and output. The reliability and therefore the usefulness of these data are thereby increased.

ABSTRACT OF DISCUSSION

Dr. Victor Richards, San Francisco: Some eight years ago Dr. Scribner and I first became interested in this problem of fluid balance. At that time, the only methods available for deciding on requisite fluid and electrolytes for patients were chemical analyses of the blood. The ions most commonly considered are the sodium, potassium, chloride and bicarbonate. It is extremely difficult—and impossible in the ordinary hospital—to get any of these studies done. Hence, this approach to determination of requisite fluid and electrolytes on the basis of the cumulative chloride balance is of tremendous value. The only possible source of error is in those conditions in which sodium and chloride are excreted independently. However, I do not believe this objection obtains if one will follow these patients daily and make the cumulative type of study which Dr. Scribner has described. Similarly, one need not be concerned about discrepancies of sodium and chloride if the p_H of the material which is excreted is followed. That will enable the physician to decide whether the person has become acidotic or alkalotic, and that in turn will enable him to predict body sodiums accurately on the basis of chloride determinations. This is an extremely simple and effective measure for deciding the body needs of water, sodium and chloride. Dr. Scribner has not commented about potassium, and that is one source of difficulty which might arise in predicting body fluids and salts solely on the basis of the chloride technic. About 50 milliequivalents of potassium is lost daily, and in these patients this method of calculation is perfectly satisfactory if the potassium loss is added in addition with about 50 milliequivalents a day, plus the amount that is lost in these body electrolytes. This, then, is an extremely simple and inexpensive and practical way of settling the fluid and electrolyte needs of patients on an accurate basis without the necessity of detailed analysis of sodium, chloride and bicarbonate in the blood. It will be a great help in the handling of surgical problems of fluid and water balance.

Dr. Dwight L. Wilbur, San Francisco: Drs. Scribner, Power and Rynearson are to be congratulated on bringing to the bedside a simple, effective way of determining the needs for water and chlorides of the patient who, postoperatively or because of cardiac or renal disease, is apt to develop deficiencies in his electrolyte and fluid balance. It is surprising that so many patients have done so well after the parenteral administration of fluids. The amount and the chemical content of fluids so administered often have been determined largely by guessing the needs of the patient. Frequently a patient has been in serious imbalance which has not become apparent until the occurrence of edema, cardiac or renal embarrassment, or death. By the authors' methods fairly accurate information can be obtained concerning the chloride and fluid balance of the patient, and therefore his daily needs may be estimated. Most important, however, imbalance can be detected and corrected before serious complications occur. This method is not only clinically effective but useful in training the physician and surgeon at the bedside to think in terms of the total metabolism of salt and water and not merely in terms of the concentration of chloride in the plasma or the amount of urine excreted. Finally, this simple method has the merit of prevention at small cost of the complications and diseases that are costly both economically and in terms of morbidity and mortality.

Dr. Belding H. Scribner, Rochester, Minn.: We have attempted to demonstrate that the determination of chloride balance is now available to everyone and can be accomplished inexpensively and without special facilities. We do not imply that because the data are readily available they are easy to interpret when first encountered. However, most of the trouble in learning to use these balance data is due to lack of familiarity with the concepts involved. For example, physicians are accustomed to thinking of a patient's sodium chloride requirements in terms of the concentration of electrolytes in the serum. Balance data require that these requirements be thought of in terms of the total amount of sodium chloride in the body. It is desirable that this be done, and with a little practice one can soon learn to use water-chloride balance data effectively to determine the daily salt and water requirements of patients. These water-chloride balance studies make the management of problems of fluid balance more interesting and instructive because they tend to explain some of the basic principles of fluid balance in terms of the patient who is being treated. If a physician is interested in learning about renal regulation of acid-base balance, our technics enable him to observe the regulation as it operates in his patients. Suppose a balance study is being conducted on a patient in whom gastric retention develops and who requires gastric aspiration. First, the balance sheet will indicate whether the gastric aspirate is extremely acid, suggesting that more chloride than sodium is being lost and that an alkalosis may develop. If the alkalosis does develop the physician can observe a negative chloride balance, a lowering of the output of chloride in the urine and, most important, a pronounced shift in the urinary p_H to the alkaline side, indicating that the kidney is attempting to correct the situation by excreting a urine which is high in sodium and low in chloride. By being able to follow such events in his own patients a physician will soon discover that these water-chloride balance studies continually dramatize the principles of fluid balance and thereby encourage him to learn more about them.

ACCIDENTS, CHILDHOOD'S GREATEST PHYSICAL THREAT, ARE PREVENTABLE

HARRY F. DIETRICH, M.D.
Beverly Hills, Calif.

After 1900, patient, painstaking and often brilliant work in the fields of public health and preventive medicine resulted in dramatic reductions in the morbidity and mortality of most infectious diseases; since 1936 the success of antibiotic therapy and chemotherapy in the most fearsome infections has resulted in even more miraculous reductions in mortality rates. Yet the very triumph of modern antibiotic and chemotherapeutic medicine has given new statistical significance to an old problem. Over 100 years ago Condie [1] wrote, "Burns and scalds are among the most frequent accidents that occur. . . . The carelessness of parents and servants, the natural temerity and incautiousness of children . . . render these accidents of such frequent occurrence. . . ." The recent precipitous decline in death rates from disease is in shocking contrast to the essentially unchanged death rate from accidents.

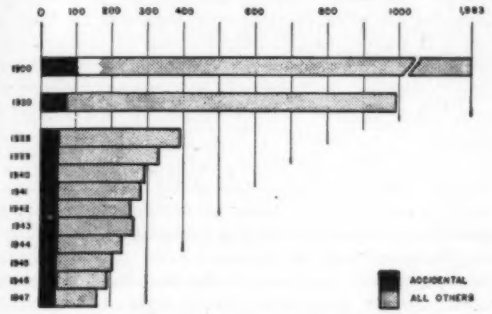

Fig. 1.—Chart showing the decrease in total death rates due to public health and preventive medicine and modern therapy. The rate constancy and growing importance of accidental death is apparent. (The accident rate of 1900 was unobtainable.)

Figure 1 tabulates the diminishing death rates from disease and the too constant death rate for accidents in preschool children of one to four years of age.

Accidents now kill more children than any single disease and actually account for one third as many deaths as all diseases combined. In figure 2 the number of deaths from accidents is oriented in the five commonest causes of death for the one to four year age group.[2] That two different groups of accidents rank in the first five causes of death is worthy of serious thought and positive action. Figure 3 requires no comment; it illustrates the relative frequency of accidental death compared to the next commonest cause or causes of death for the indicated age groups. It forces the question, however, "Do we expend our money, efforts and emotions combating the most important threats to our children, or is most of our concern with dangers of secondary importance?" Though not to be belittled, the problems of poliomyelitis, heart disease, cancer and tuberculosis in children are dwarfed by the physical and emotional devastation brought by juvenile accidents. The leading lethal role of accidents has somehow escaped proper emphasis, but it cannot be challenged; over a year ago the magnitude of the problem was aptly indicated in THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.[3]

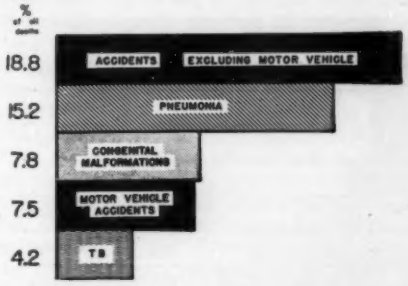

Fig. 2.—Leading causes of death of children aged one to four years in the United States in 1947. In this age group accidents not only rank as the leading cause of death but occupy two of the first five positions as causes of death.

In one year over 12,500 children were killed by accidents.[4] How many children were permanently crippled is completely unknown. Roberts and Gordon,[5] in studying home accidents (all ages) in Massachusetts, found that for every person killed 150 were injured and four received permanent disability. Temporary application of this estimate (for lack of another figure) to the juvenile accident field would suggest that approximately 50,000 children a year were permanently injured in the United States.

This tremendous morbidity and mortality has excited only desultory thought and uncoordinated action by the medical profession. Wheatley [6] has indicated that the United States Children's Bureau, the National Safety Council, the Academy of Pediatrics and the Metropolitan Life Insurance Company are aware of the problem; the last named has perhaps been most active in its attack. In industry, aviation and traffic management much has been written about accidents and their

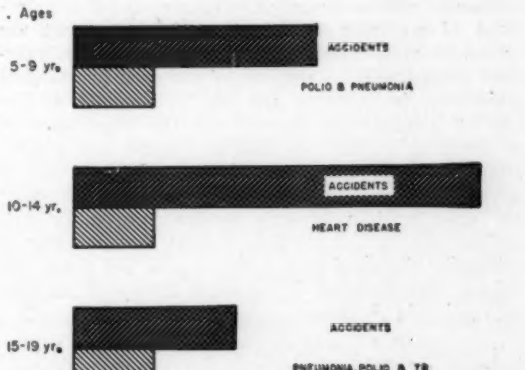

Fig. 3.—Chart showing the ratio of deaths due to accidents and the next commonest cause or causes for the indicated age groups.

Read before the Section on Pediatrics at the Ninety-Ninth Annual Session of the American Medical Association, San Francisco, June 28, 1950.

From the Childrens' Hospital, the Department of Pediatrics, University of Southern California Medical School, Los Angeles and the Beverly Hills Clinic, Beverly Hills.

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2. Summary of Vital Statistics, 1947, Federal Security Agency, United States Public Health Service, National Office of Vital Statistics, vol. 30, no. 1, Sept. 15, 1949.
3. Our Greatest Child Health Problem, Current Comment, J. A. M. A. **139**: 588 (Feb. 26) 1949.
4. Child Accident Fact Sheet, Chicago, National Safety Council, 1949.
5. Roberts, H. L., and Gordon, J. E.: Home Accidents in Massachusetts, New England J. Med. **241**: 435-441 (Sept. 22) 1949.
6. Wheatley, G. M.: Child Accident Reduction: A Challenge to the Pediatrician, Editorial, Pediatrics **2**: 367-368 (Sept.) 1948.

economic significance; few investigators have attempted to establish basic concepts in the field of accident prevention. Roberts and Gordon have intimated that there is an epidemiology of accidents. Over 10 years ago Godfrey [7] urged that accident prevention be considered a public health problem and stressed the importance of home accidents. Armstrong and Cole [8] have been particularly interested in studying home accidents among

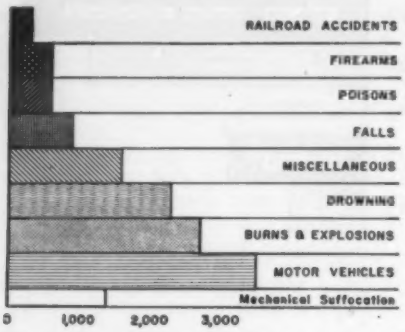

Fig. 4.—Chart showing the number of deaths from the various types of common accidents in the United States in 1947 involving children (14,000) under 15 years of age.

certain insured groups. Manning [9] briefly mentioned accident prevention in her prize-winning essay on preventive medicine. The Bakwins [10] reviewed the psychological implications in the accident-prone person, and Ackerman and Chidester [11] analyzed an aggravated case in a child. In England special commissions have been activated to survey the problem, and in one town studied 9 per cent of the children under 10 years of age received hospital treatment for accidents during one year.[12] A few specialists have become concerned with the accidental tragedies in their patients. Jeancon [13] is mentioned because that concern has expanded her activity from ophthalmology to the general field of accident prevention in children. Graves [14] summarized the importance of accidents in children and pointed out the household areas where particular care should be exercised. Separately he emphasized the need for accident prevention in pediatric nursing.[15] Recently Esther Clark [16] dramatically pointed out the importance of accidents as a cause of childhood death and emphasized the "life years" and "working years" lost by juvenile accidental death. Spock indirectly indicated the close relation between accident prevention and general child-parent relations.[17] Each author writes of protecting the child from poisons, pots and pools, but no one has formulated a general theory of accident prevention in childhood.

Here is a problem to challenge every member of the medical profession, and it must do so individually. The problem of accident prevention in childhood is unique. No endowed foundation, no research laboratory and no inspired investigator is going to develop a vaccine, serum, antibiotic, endocrine extract or operation that will prevent accidents. Though interest, thought and statistical research can be stimulated at the community level, the ultimate mediators of any accident prevention program in childhood are the parents. They must be reached individually or in community groups by the physician, who must offer a reasonable theoretical solution. Even though a physician may not choose to work on the problem at the community level, he cannot escape his responsibility of functioning effectively in the doctor-patient relation. No specialty can validly disclaim this responsibility.

In the discussion to follow it must be emphasized that "accidents" refers only to lethal, or physically, psychologically or economically crippling types of injury. Burning, drowning, poisoning, crushing, shooting and mangling include most of the serious accidents. Bowden [18] has most recently shown that "smothering" belongs in the same diagnostic wastebasket as "thymic death"; it should, in all but the rarest of instances, be deleted from the figures on accidental deaths. The earlier mention of "over 12,500 annual accidental deaths" has already been reduced by 1,400 alleged instances of suffocation. The relative frequency of the various fatal accidents is shown in figure 4.

Just as the normal child will suffer certain not overwhelming frustrations without permanent emotional disfigurement, so in the process of ambulation, exploration and education must he expect certain minor injuries. Split lips, polychrome lumps, chipped deciduous teeth, blistered fingers, simple fractures and gory but not gruesome lacerations must be accepted as normal wear and tear; properly handled by the physician and the parents, they can be of positive educational value.

THEORY OF ACCIDENTAL PREVENTION

How can the physician advise on accident prevention? In adults accident prevention must be engrafted like ritualist manners or military courtesy; more rarely it can be taught as an intellectual discipline. A theory of accident prevention which embraces a changing reciprocal relation between protection and education seems needed in work with children; the relative roles of these two components related to age is suggested in figure 5. Briefly stated, pediatric accident prevention begins with 100 per cent protection at birth; this protection must be absolute and must be maintained through most of the first year of life. The nonambulatory infant under one year of age, who is not adroit at dodging, is completely at the mercy of its custodians. If he is burned, crushed, drowned, poisoned or mechanically mangled it is directly the fault of the persons responsible for his care; the

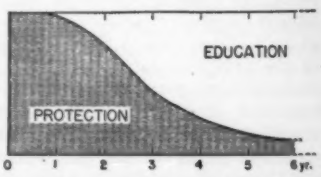

Fig. 5.—Diagrammatic depiction of the theory of accident prevention showing the changing and reciprocal relation of protection and education related to age.

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18. Bowden, K.: Sudden Death or Alleged Accidental Suffocation, M. J. Australia **1**: 65-72 (Jan. 21) 1950.

responsibility of the physician to instruct parents is obvious. Accident prevention in the young infant is therefore remarkably simple. However, if such absolute protection were maintained for a relatively few years the child would be unusually vulnerable to accident.

As indicated in the graphic representation of the theory of accident prevention in children, the early introduction of a rapidly increasing component of education is essential. While maintaining protection against serious accidents, parents should expose children who have reached the age of one year to the educational value of minor painful experiences. This is the beginning of an important and difficult period, for by 6 or 7 years of age the child should need protection only from previously unexperienced or incomprehensible perils. He will still need frequent reminders, but protection in general is infeasible because his activities move him physically from the sphere of parental influence. Education accompanies the child; protection remains at home. It is obvious then that the 1 to 5 year age period is the critical one. Here the pattern for future safe conduct (as most other behavior patterns) is set.

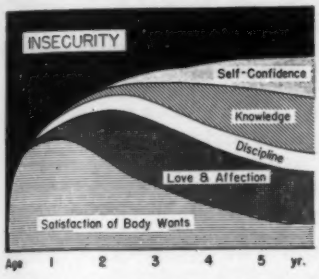

Fig. 6.—Illustration of the development of "sense of security," with the relative importance of the several components related to age.

It is impossible didactically to present rules for each child at each age. The interests, imagination and opportunities of the individual youngster are too varied. However, certain major catastrophies threaten every child. One may consider as examples some of the main threats to a 20 month old infant and how the parents might combine protection and prophylactic education. In the prevention of serious burns the parents should never allow the infant to be near the stove (in use or not), an open flame or potential electrical hazards. Even casual handling of matches or lighters should not be permitted, for the infant cannot appreciate their inflammable potentialities. This is protection. The heat of any commonly hot article, like a coffee pot, should be repeatedly demonstrated by lightly touching the child's hands to it. With proper warnings, the contacting of a lighted cigaret should be encouraged to clarify and emphasize the "hot" concept. This is education. With the child's climbing abilities well in mind, the parents should place poisons and caustics out of reach; a bottle of vinegar or a jar of hot mustard left where discovery is inevitable may well provide the first lesson that not everything in bottles is pleasantly imbibable. No young infant should be allowed near machinery with exposed moving parts (wringers, sewing machines, farm implements, lawn mowers, electric fans), but a finger nail torn or bloodied in the exploration of a manual egg beater is a small price to pay for initiation of respect for the moving parts of machinery.

The first educational step in the prevention of drowning presents a peculiarly difficult problem. For over a year and a half parents have, by every action, indicated to the infant only the virtues of water. They have encouraged his drinking of it, they have made a fetish of using it on his face, hands and body, they have laughingly and rightly encouraged his playing with it and have highly praised him when he has deposited his precious excreta in it. Now they are faced with the apparent paradox of convincing him that it, in large amounts, is dangerous and bad. The aim should be to teach him respect for, rather than fear of, deep water. If, instead of spending the daily bath time fallaciously proving to the infant that he is unsinkable ("look at baby swim"), they occasionally let him discover that he cannot stay afloat and that water in the air passages is not comfortable, they could, without instilling fear, encourage respect for deep water.

It must be obvious that for any one child the prevention of a particular type of accident will employ varying protective and educational pressures at different ages. The presentation here of the problem of serious falls in the male is not all-inclusive. During the first year of life the prevention is protection—the infant should neither be dropped nor allowed to drop. Protection must be 100 per cent. As soon as the infant becomes ambulant the problem is more complicated. He must be protected against serious falls and at the same time must gain a respect for the potentiality of falling. He must not be allowed to fall from dangerous heights, nor on dangerous surfaces, nor with dangerous objects in his hands. Thus upstairs screens must be nailed; pools, ditches and ponds must be fenced or effectively prohibited, and cellar doors must be locked. The child should be permitted to fall out of chairs (education) but not with potentially dangerous implements in his hands (protection). He must gradually be taught in minor, painful (but not lethal or crippling) ways the concept of gravity and falling. When the child begins to climb, his actions should be neither forbidden nor dramatized. He must be taught to expect falls and therefore to think about where he is going to fall. Minor falls should not be poulticed with major emotional or gustatory awards. He should be instructed to keep the area where he might land in a fall clear of garden tools, wagons and other secondarily injurious objects. He should be taught that climbing is a skill to be practiced, not an accomplishment to be socially exploited. The interested boy eagerly accepts instruction in how to test footholds—on branches, fences and rocks. He gladly learns how to pick the safest landing areas and body attitudes in case a fall is unavoidable. The natural mechanistic interests of the 7 to 9 year old boy lend themselves to an appreciative acceptance of the care, use and dangers of ropes, pulleys and ladders. Finally, after many intermediary experiences, the young man arrives at the age of 21 years. Whether he is climbing power poles for a living or clambering up mountains for fun, he will unconsciously employ an accumulated body of knowledge and skill for accident prevention; but in dangerous situations he still will avail himself of the protection (enforced by company order or elected by himself) of a safety belt or pitons and a rope.

I have suggested that the reciprocal relation of protection and education related to a child's age constitute a workable theory of accident prevention. This implies that the theory is applicable by the parents. It is. The tools needed are forethought, time and discipline. The forethought must be devoted to anticipation of the child's interests and activities. "He hasn't turned over yet" is an attitudinal invitation to disaster. "Your garden job this week" is avidly read by many parents who still in practice apparently subscribe to the "a child is a child" philosophy; they fail to anticipate constantly changing interests and activities. Here the physician can supply valuable advice and can proba-

bly aid by suggesting graded educational situations. Time might seem to be a limiting factor, but if physicians would allay parental worry about nonessential and nonremediable worries, mothers and fathers would have the time necessary to insure the safety of their children.

Without being facetious or flippant, I maintain that, if all the time wasted by parents on fruitless worrying about poliomyelitis, nineteenth century worrying about the size, shape and color of bowel movements, harmful worrying about appetites, puerile worrying about temporary cosmetic blemishes, guilty worrying about juvenile masturbation and competitive worrying about their children's ounces and inches—if all this wasted emotional effort and time were employed in thinking about accident prevention, parents would have more living children. Again the physician's role is clear and unavoidable. He must be careful lest he magnify, by his attitude, his treatment or his charges, the parents' worries about less important problems. Parents must be shown that pimples, poliomyelitis and pounds are relatively unimportant problems. They must be shown that accidents present a greater hazard than the threats our too thoroughly propagandized society ordinarily fears for its children. Accidents are brutal and basic. Then, too, parents must be convinced that the prevention of serious accidents is possible by their own efforts. But forethought and time are not enough.

The third indispensable tool for the application of the theory of accident prevention in children is discipline. Misinterpretation of modern psychological and psychoanalytical thought has robbed too many children of the emotional security and physical protection that is afforded by mild, consistent, understanding and logical discipline. There is perhaps no child so basically insecure as the youngster who knows that his parents will not control his accidental, experimental or vindictive threats. There is perhaps no young adult so emotionally vulnerable to the pressures of a frustrating civilization as the young adult who has not had to cope with some childhood frustrations. In general, mild discipline, introduced in the last few months of the first year, must be reinforced and expanded in scope during the second year to protect the child against all the major threats to his safety that cannot be removed from his reach. During the second year active discipline should probably have no other objective. To be safe, the 20 month old infant must be trained (disciplined) to stay away from the kitchen stove, all machinery, electrical outlets and connections, fire-making contrivances and the streets. Throughout childhood there must remain a leash (not lash) of discipline to serve where reason cannot—and from this leash will ultimately develop the halter of self discipline.

RELATION OF ACCIDENT PREVENTION TO EMOTIONAL SECURITY

If it had none but its obvious value—the prevention of death and crippling in children—accident prevention would be worthy of the attention of all physicians. However, accident prevention is not an isolated facet of child care. In its dynamic conception it is an integral part of the emotional development of children. It is beyond the province of this discussion to attempt to detail the development of a sense of security in childhood; for brevity's sake figure 6 is offered as a graphic representation of the relative importance of the various factors involved at different age levels. If the concept is accepted that the desire for "lack of pain" is one of the basic body wants, then the contribution of an accident prevention program to each of the components of a sense of security is obvious. A child's assurance of parental love and affection is immeasurably enhanced by his knowledge that his parents will not permit him to perform any truly injurious act. His need for discipline is fruitfully satisfied. His sense of physical security is augmented. An imaginative accident prevention program adds tremendous increments to both self confidence and knowledge. In brief, there is certainly no other phase of the parent-child relation which so broadly and literally enhances a child's sense of security.

THE PHYSICIAN'S ROLE

A medical problem of tremendous importance to the health and life of children has been defined. A practical theory for the prevention of accidents has been presented, and the tools necessary for the application of the theory have been enumerated. The responsibility for the distribution of this information to parents rests primarily on the medical profession. We physicians will be most remiss in our obligations to insure the health of children if we do not initiate and continually activate programs of accident prevention. Such activity by the medical profession should logically proceed at several levels:

1. The patients of individual physicians should be appraised of, and advised on, the problem of accident prevention in children. The frequency of accidental death and crippling should be placed in its proper perspective, which implies sound education of the laity on other medical problems. Press[19] suggested that, when, at the time for the child's immunization, a mother expresses the wish that she could "take the baby's shot for him," she should be reminded that only she can "immunize" him against the greater threat and pain of serious accident.

2. Community resources should be recruited to adopt accident prevention programs as primarily important ones. As was editorially stated in THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION[20] ". . . as professional men and citizens they (physicians) are free to take the initiative. Individually, and in civic or municipally sponsored groups, members of the medical profession have a compelling responsibility. Physicians can play an effective, even dramatic, role in the prevention of accidents. . . ." Armstrong and Cole[21] have provided a workable outline for the organization of community accident prevention. These same resources should be informed of the truly vital importance of obtaining accurate figures on crippling due to accidents. The economic effects of childhood accidents provide another field for fruitful survey.

3. Additional attempts must be made to stimulate, at national levels, an active appreciation of the problem of accidental death and crippling in children and an awareness that the problem is not insoluble.

It should further be pointed out that parents who are thoughtful about the possibility of accidents to their children will unconsciously be thoughtful about themselves, whether they are in an oil refinery, a mine, a kitchen or an automobile or on a farm. This intensification of adult awareness of accident hazard through child safety programs should be worthy of nurturing

19. Press, E.: The Accident Problem, J. A. M. A. **135**: 824-827 (Nov. 29) 1947.
20. Accidents, Editorial, J. A. M. A. **142**: 732 (March 11) 1950.
21. Armstrong, D. B., and Cole, W. G.: Can Child Accidents Be Prevented in Your Community? Am. J. Pub. Health **39**: 585-593 (May) 1949.

by the American Red Cross, the Blue Cross and similar hospital plans, the National Safety Council, all national industrial groups and insurance companies. The intimate relation between accident prevention programs in children and the development of a sense of security should be brought to the attention of the various mental hygiene movements, juvenile parole associations and similarly motivated national groups. In all of this the physician must be the activator. Here is an opportunity for the physician who has no research grant, no medical school teaching affiliation, no laboratory training and no investigative experience or opportunity to aid tremendously child health at the family, community or national level.

SUMMARY

Accidents constitute the greatest single threat to children's lives and physical health. How many children are permanently crippled by accidents is not, but should be, known. A theory of accident prevention embracing a changing reciprocal relation between protection and education is suggested. The practical application of such a theory requires forethought, time and discipline. A properly applied program of accident prevention contributes to each component of a child's sense of security. While the ultimate mediation of an accident prevention program in children rests with the parents, the immediate responsibility falls on, and must be accepted by, the medical profession.

416 North Bedford Drive.

Clinical Notes, Suggestions and New Instruments

AGRANULOCYTOSIS DUE TO GANTRISIN®

Report of a Case with Recovery

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and
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Gantrisin,® previously designated NU-445, is 3,4-dimethyl-5-sulfanilamide isoxazole. Since early in 1946 this sulfonamide has had rather extensive experimental and clinical trial,[1] and all observers repeatedly emphasized the apparent low toxicity of the drug. Though infrequent, the usual toxic phenomena incident to the use of other sulfonamide compounds have been noted, including dermatitis,[2] anorexia,[3] nausea, vomiting,[4] headache,[5] fever,[2a, b] vertigo,[2f, g] crystalluria [6] and hematuria.[7] A review of all available published clinical reports to date discloses only eight instances of leukopenia.[2f, g] Neutropenia of moderate degree was present in two of these eight cases. In neither of the two cases were neutrophils depressed below 30 per cent.[8] However, in several clinical reports specific mention of leukocyte counts was not made.

The present case of true agranulocytosis due to gantrisin® is reported because: (1) to our knowledge this is the first instance of total disappearance of granulocytes following the use of this drug, and (2) it is hoped that this report will serve to discourage indiscriminate use of the drug.

REPORT OF CASE

History.—A woman aged 47 was examined by one of us (C. M. G.) on Jan. 4, 1950. Her chief complaints were slight frontal headache, running nose, nonproductive cough, myalgia and general malaise of five days' duration. Inquiry into the past history was noncontributory except for a "cold" one month previously, for which the patient had not consulted a physician.

Physical Examination.—The patient was well nourished and did not appear acutely ill. The temperature was 102.4 F., the pulse rate 100 per minute and the respiratory rate 18 per minute. The scleras, nasal mucosa and pharynx were moderately injected. The neck, heart, lungs, abdomen, pelvis, rectum, extremities and central nervous system were entirely normal.

Treatment.—The diagnosis at this time was acute upper respiratory infection. Therapy consisted of steam inhalations, bed rest and administration of aureomycin hydrochloride 250 mg. every six hours. Within 12 hours the patient was afebrile and generally much improved. However, the symptoms recurred after 24 hours, the temperature rising to 102.5 F. Aureomycin therapy was stopped on account of nausea of the patient, who was then given 600,000 units of procaine penicillin G in peanut oil intramuscularly every 24 hours, together with 1 Gm. of gantrisin® every three hours. High fluid intake was encouraged. The only other medicaments prescribed were aspirin (acetylsalicylic acid) 10 grains (0.65 Gm.) and codeine ½ grain (0.03 Gm.) every four hours as necessary for headache and malaise. On the fifth day of this regimen the temperature of the patient rose to 104 F. and she appeared acutely ill, now complaining of sore throat, burning distress in the substernal and epigastric regions, moderate prostration and severe pain in the head, neck, back and muscles.

From the Department of Internal Medicine, Grand Forks Clinic, and the University of North Dakota School of Medicine.

1. Schnitzer, R. J., and others: Pharmacological and Chemotherapeutic Properties of 3,4-Dimethyl-5-Sulfanilamido-Isoxazole, J. Pharmacol. & Exper. Therap. **88:** 47-57 (Sept.) 1946. Sarnoff, S. J.; Freedman, M. A., and Hyman, A. A.: The Treatment of Bacillus Proteus Infections with NU-445, J. Urol. **55:** 417-427 (April) 1946. Svec, F. A.; Rhoads, P. S., and Rohr, J. H.: New Sulfonamide (Gantrisin): Studies on Solubility, Absorption and Excretion, Arch. Int. Med. **85:** 83-90 (Jan.) 1950. Haines, W. H., and Miceli, S.: Some Observations on the Management of B. Proteus Infections of the Urinary Tract, Pennsylvania M. J. **50:** 1328-1330 (Sept.) 1947. Carroll, G.; Allen, H. N., and Flynn, H.: Gantrisin: An In Vivo and In Vitro Study in Urinary Infections, Urol. & Cutan. Rev. **53:** 677-683 (Nov.) 1949. Schiffrin, M. J.: Gantrosan, Mod. Hosp. **72:** 104-110 (March) 1949. Wuest, H. M., and Hoffer, M.: Isoxazole Derivatives of Sulfanilamide, United States patent 2,430,094, Official Gazette, United States Patent Office **604:** 112 (Nov. 4) 1947. Rhoads, P. S.; Svec, F. A., and Rohr, J. H.: Laboratory and Clinical Observations on the Use of a New Sulfonamide: 3,4-Dimethyl-5-Sulfanilamido-Isoxazole (NU-445), J. Lab. & Clin. Med. **32:** 1530-1531 (Dec.) 1947. Bryer, M. S.; Schoenbach, E. B.; Ott, C. E., and Long, P. H.: The Experimental Pharmacology and Effectiveness of 3-4,Dimethyl-5-Sulfanilamido-Isoxazole, abstracted, Bull. Johns Hopkins Hosp. **82:** 633-635 (June) 1948. Marshall, E. K., Jr.: Distribution of 3,4-Dimethyl-5-Sulfanilamido-Isoxazole in the Body, Proc. Soc. Exper. Biol. & Med. **68:** 472-473 (July-Aug.) 1948. Rhoads, P. S., and Schram, W. R.: Bacteremia Following Tooth Extraction; Prevention with Penicillin and 3,4-Dimethyl-5-Sulfanilamide-Isoxazole (Gantrosan), abstracted, J. Lab. & Clin. Med. **33:** 1461 (Nov.) 1948. Fergusson, J. D.; Reinold, D. G., and Wrigley, F.: Dimethylsulphanilamido-Isoxazole (NU-445) in Urinary Infections, Lancet **2:** 969-971 (Dec. 18) 1948. Wilhelm, S. F., and Orkin, L. A.: The Increased Pathogenicity of Bacillus Lactis Aerogenes in Urinary Tract Infections, J. Urol. **61:** 131-139 (Jan.) 1949. Dowling, H. F.; Sweet, L. K.; Hirsh, H. L., and Lepper, M. H.: Specific Therapy of Bacterial Infections of Central Nervous System, J. A. M. A. **139:** 755-758 (March 19) 1949. Schweinburg, F. B., and Rutenburg, A. M.: NU-445 in the Treatment of Urinary Infections Due to Gram Negative Bacilli, Proc. Soc. Exper. Biol. & Med. **71:** 20-23 (May) 1949; A Simple Method for Determining Sulfonamide Sensitivity in Vitro and Its Clinical Application, J. Lab. & Clin. Med. **34:** 1457-1461 (Oct.) 1949. Siniscal, A. A.: Trachoma in Missouri, Arch. Ophth. **42:** 422-437 (Oct.) 1949. Whelton, R. L.; Caldwell, E. R., Jr.; Lepper, M. H.; Sweet, L. K., and Dowling, H. F.: The Treatment of Poliomyelitis and Phenosulfazole, J. Pediat. **35:** 447-450 (Oct.) 1949. Wilhelm, S. F.; Schloss, W. A.; Orkin, L. A.; Seligmann, E., and Wassermann, M.: Aerobacter Aerogenes Infection of the Urinary Tract: Effective Treatment with Aureomycin, J. A. M. A. **141:** 837-839 (Nov. 19) 1949. Herring, A. L.: The Use and Abuse of Urinary Antiseptics, Mississippi Doctor **27:** 329-332 (Dec.) 1949. Footnotes 2, 6a and 8.

2. (*a*) Rodger, R. S., and Colby, F. H.: A Clinical Evaluation of a Recent Sulfonamide: NU-445, J. Urol. **59:** 659-663 (April) 1948. (*b*) Narins, L.: The Treatment of Bacillus Coli and Bacillus Proteus Infections of the Urinary Tract with a New Sulfonamide (NU-445), ibid. **59:** 92-95 (Jan.) 1948. (*c*) Rhoads, P. S.; Svec, E. A., and Rohr, J. H.: Clinical Evaluation of a New Sulfonamide: Gantrisin, Quart. Bull. Northwestern Univ. M. School **23:** 104-111, 1949; (*d*) Observations on the Use of a New Sulfonamide, Gantrisin, Mississippi Valley M. J. **71:** 87-89 (May) 1949; (*e*) Bacterial Meningitis: Results of Treatment in 17 Cases with New Sulfonamide (Gantrisin), Arch. Int. Med. **85:** 259-264 (Feb.) 1950. (*f*) Lazarus, J. A., and Schwarz, L. H.: A Clinical Study of a New Sulfonamide (NU-445) in the Treatment of Urinary Tract Infections, J. Urol. **61:** 649-657 (March) 1949. (*g*) Thompson, H. T.: A Clinical Evaluation of Gantrisin (NU-445), ibid. **62:** 892 (Dec.) 1949. (*h*) Brickhouse, R. L.; Lepper, M. H.; Stone, T. E., and Dowling, H. F.: The Treatment of Pneumonia and Other Infections with a Soluble Sulfonamide, Gantrisin (NU-445; 3,4-Dimethyl-5-Sulfanilamido-Isoxazole), Am. J. M. Sc. **218:** 133-137 (Aug.) 1949.

3. Footnote 2, parts e, e and g.
4. Footnote 2, parts a through e, g and h.
5. Footnote 2, parts c through g.
6. (*a*) Sarnoff, S. J.: Studies on 3,4-Dimethyl-5-Sulfanilamido-Isoxazole (NU-445) in Humans, Proc. Soc. Exper. Biol. & Med. **68:** 23-26 (May) 1948. (*b*) Footnote 2, parts c, d, e and h.
7. Footnotes 2, parts d, g and h, and 6a.
8. Thompson, H. T.: Personal communication to the authors.

On Jan. 10, 1950 she was admitted to the Grand Forks Deaconess Hospital. The temperature was 104.6 F., the pulse rate 130 per minute and the respiratory rate 20 per minute. The scleras were not injected. A round, sharply circumscribed 0.5 cm. lesion with necrotic center and erythematous periphery was noted on the buccal mucosa opposite the right lower canine tooth. Likewise, two smaller lesions were noted on the lower anterior buccal mucosa. No other skin or mucous membrane lesions were in evidence. The nasal and pharyngeal mucosa appeared normal. The blood pressure was 140 systolic and 75 diastolic. The heart, lungs, pelvis, rectum and reflexes were entirely normal. There was moderate tenderness in the epigastrium, but no masses were palpable. The spleen definitely could not be palpated.

Roentgen appearance of the chest was normal except for a calcified primary tuberculous complex in the left hilar region and moderate increase in bronchovascular markings throughout both lung fields. The urine was normal except for a trace of albumin. The hemogram showed red blood cells 3,990,000 per cubic millimeter and hemoglobin 12.2 Gm. (72 per cent). White blood cells were counted three times and averaged 1,500 per cubic millimeter. The differential count showed total absence of granulocytes, 78 per cent lymphocytes, 22 per cent monocytes, no eosinophils and no basophils. Bleeding and coagulation times were normal. The blood platelets numbered 282,000 per cubic millimeter. Subsequent differential counts were made on buffy coat smears, and these results together with serial white blood counts are shown in the accompanying table. Agglutination tests for infectious mononucleosis, typhoid, paratyphoid and brucellosis were negative.

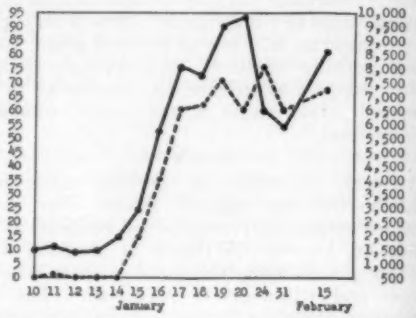
Course in the Hospital.—The patient became progressively worse for four days after admission to the hospital. She complained of extreme weakness, burning substernal and epigastric distress, sore mouth, headache and chilly sensations. Fever was intermittent, rising to 103 F. or less several times daily. The first few days of therapy consisted of strict bed rest, orally given aureomycin 500 mg. every six hours, aqueous crystalline penicillin G 100,000 units intramuscularly every three hours and pentnucleotide® (an 8 per cent solution of the sodium salts of four pentose nucleotides derived from yeast nucleic acid by mild alkaline hydrolysis) 2 ampules daily intramuscularly. Gantrisin® therapy was discontinued immediately on discovery of leukopenia and agranulocytosis. In addition to these measures the patient received 250 cc. of whole blood twice daily from January 12 to 14 inclusive. On Jan. 11, 1950 new lesions, similar to those described previously, were noted on the epiglottis.

Blood Picture in a Case of True Agranulocytosis Due to Gantrisin®

Date	W. B. C.	Neutrophils, %	Lymphocytes, %	Eosinophils, %	Basophils, %	Monocytes, %
1/10/50	1,500	0	78	0	0	22
1/11/50	1,000	1	90	0	0	10
1/12/50	1,400	0	77	0	0	23
1/13/50	1,450	0	74	0	0	26
1/14/50	1,950	0	49	0	0	51
1/15/50	3,000	14	67	0	0	19
1/16/50	5,700	36	54	0	0	10
1/17/50	8,000	60	33	0	0	7
1/18/50	7,700	62	31	1	1	5
1/19/50	9,500	71	24	0	0	5
1/20/50	9,800	60	34	0	0	6
1/24/50	6,500	76	20	0	0	4
1/31/50	5,800	59	35	0	1	5
2/15/50	8,700	67	29	1	1	2

The accompanying chart depicts the rise in total leukocytes with the reappearance and precipitous rise of neutrophils. Total absence of granulocytes persisted for five days after the diagnosis was made. A dramatic rise from zero to 60 per cent occurred in only three days, and similarly total leukocytes rose from 1,950 to 8,000 during the same period. Improvement in the patient's symptoms paralleled reversion of the blood picture to normal. Several peripheral blood smears were made daily from January 10 to 20 inclusive and appeared essentially normal except for the disturbance in granulocytes and total leukocytes (table). No buffy coat was demonstrated in the centrifuged venous blood specimens from which peripheral smears were made from the top millimeter of the packed cells.

Bone marrow aspirations were performed on Jan. 12 and 15, 1950. Each specimen was aspirated from the sternum, treated with heparin-oxalate mixture and centrifuged; smears were made from the buffy coat. Examination of smears taken on January 12 showed the nucleated red cell elements to be relatively increased. Maturation was of the normoblastic type, but there appeared to be an arrest in development at the level of the late polychromatophilic stage. The earlier developmental stages were well represented, but few late polychromatophilic forms were present. They comprised only 6 per cent of the 32.5 per cent red cell elements. No orthochromatic normoblasts were found. Megakaryocytes were few but probably not reduced below the normal number. Their morphology and that of the platelets appeared normal. The differential count of nucleated cells was: "blast" forms 9 per cent; promyelocytes 15 per cent; myelocytes 5 per cent; metamyelocytes (all types) zero; red blood cells 32.5 per cent; lymphocytes and monocytes 38.25 per cent; neutrophils zero; eosinophils zero, and basophils 0.25 per cent.



Graphic presentation of the reappearance of neutrophils and rise of total leukocytes in peripheral blood in a case of true agranulocytosis due to gantrisin.® The figures at the left represent the percentage of neutrophils (broken line on chart), the figures at the right the leukocytes per cubic millimeter (solid line on chart).

The absence of the late developmental forms of granulocytes was striking. There was a relative increase in myeloblasts, but probably no actual increase in their number. These cells showed normal structure. In some instances the promyelocytes showed heavy, coarse, azurophilic granulation. Myelocytes were reduced in number, both relatively and absolutely. Many of those seen had large vacuoles and multilobed nuclei. This was believed to be an artefact due to the use of oxalate. (However, at the time of the second marrow aspiration on Jan. 15, 1950 a direct smear was made before contact with oxalate. In this preparation vacuoles were also noted in the myelocytes, but the change was not nearly as pronounced as in the portion of the specimen treated with the heparin-oxalate mixture.)

No metamyelocytes of any type were seen, and, with the exception of two damaged basophils, no mature granulocytes could be found. All granulocytic forms from the late myelocyte on had completely disappeared. The lymphocytes and monocytes were relatively increased in the marrow. The lymphocytes showed functional changes similar to those seen in the peripheral blood. No abnormal cell forms were noted. These smears were also reviewed by Dr. M. M. Hargraves of the Mayo Clinic, who concurred in the opinion that they were typical of agranulocytosis secondary to drug sensitivity.

Examination of peripheral blood smears on Jan. 12, 1950 showed slight anisocytosis and hypochromia of red blood cells. There was no evidence of red cell regeneration. Platelets appeared to be present in normal numbers and to have typical morphologic characteristics. Leukocytes were greatly reduced in number. The white blood cell count was 1,400. The differential count (see table) was lymphocytes 77 per cent and monocytes 23 per cent. No neutrophils could be found in several smears. A sample of venous blood was drawn, using a commercial heparin-oxalate mixture as anti-coagulant, and

centrifuged. No buffy coat was apparent. Smears made from the top millimeter of the packed cells showed essentially the same differential count, and neutrophils were not seen. Eosinophils and basophils were absent. The lymphocytes showed mild functional alterations. The monocytes showed no apparent morphological change.

A second sternal aspiration on Jan. 15, 1950 showed the following differential count of nucleated elements: "blast" forms 3 per cent; promyelocytes and myelocytes 34 per cent; metamyelocytes 19 per cent; red blood cells 22 per cent; lymphocytes 21 per cent; neutrophils 1 per cent, no eosinophils and no basophils. Comparison with previous smears showed a decided increase in the number of orthochromatic normoblasts. The granulocytic series showed pronounced change. Myelocytes had greatly increased in number, and metamyelocytes had reappeared. As previously mentioned, myelocytes and metamyelocytes showed small vacuoles in the direct smear. Vacuolization and bizarre multilobed nuclei were frequent in smears made from the buffy coat after the use of an anticoagulant mixture.

The patient made a complete recovery and was discharged from the hospital on Jan. 20, 1950. Subsequent leukocyte and differential counts on peripheral blood were normal. She was last seen on Aug. 10, 1950, when complete physical examination and blood studies indicated that her general health was excellent.

COMMENT

Although it cannot be proved with certainty that gantrisin® caused the agranulocytosis in this case, we believe it is fair to assume that the drug was the most likely cause. None of the other medicaments given prior to the onset of the patient's agranulocytosis are known incitants of this phenomenon. In any event it is highly improbable that penicillin or aureomycin could be responsible, because these drugs were administered during the course of the agranulocytosis from which the patient recovered. Furthermore, it was estimated that the patient took a total of 30.0 Gm. of gantrisin® over a period of five days, an amount which is more than adequate to depress the granulocytes should sensitivity to the drug occur.

SUMMARY AND CONCLUSIONS

A case of true agranulocytosis probably resulting from the use of gantrisin® (3,4-dimethyl-5-sulfanilamide isoxazole) is reported. The onset and subsidence of the condition closely paralleled administration and discontinuance of the drug. Careful studies of peripheral blood and bone marrow and follow-up examinations of the patient served to exclude other blood dyscrasias.

This report is made with the hope of discouraging indiscriminate use of the drug. Even when used with the proper indications the leukopoietic status of the patient should be checked more consistently than appears to be the practice from a perusal of current literature.

221 South Fourth Street.

Blood Sugar and the Liver.—Soskin called the liver the primitive regulator of the blood sugar, which can operate in the complete absence of insulin and the pituitary. The stimulus which elicits the hepatic response is the blood sugar itself—the so-called "homeostatic mechanism." There is evidence that the liver is able to convert a wide variety of substances into glucose and glycogen, including carbohydrates such as fructose and galactose, proteins and fat. Hepatic gluconeogenesis is increased by the anterior pituitary hormone and inhibited by insulin. Epinephrine causes hyperglycemia, resulting in a sharp decrease, then rise of liver glycogen. In advanced hepatic disease hypoglycemia results. That the liver can convert lactic acid to glycogen and the muscle glucose to lactic acid is the basis for the Cori cycle. The removal of lactic acid by the liver is important in carbohydrate metabolism. By this cycle the muscle and liver glycogen become virtually interchangeable, which is clearly demonstrated by the action of epinephrine and in muscular action.—Jean T. Hugill, M.D., Liver Function and Anesthesia, *Anesthesiology*, September 1950.

Council on Physical Medicine and Rehabilitation

REPORT OF THE COUNCIL

The Council on Physical Medicine and Rehabilitation has authorized publication of the following report.

HOWARD A. CARTER, *Secretary.*

McKESSON RESPIRAID ROCKING BED ACCEPTED

Manufacturer: McKesson Appliance Company, 2228 Ashland Avenue, Toledo 10, Ohio.

The McKesson Respiraid Rocking Bed is designed to aid respiration in certain diseases of the nervous system, particularly poliomyelitis, and to aid the circulation in cases of peripheral vascular disease. The apparatus is a bed with the spring and mattress so mounted that they can oscillate. The moving parts are provided with rests for the feet and shoulders to keep the patient from sliding back and forth on the mattress.

The unpacked apparatus is stated to measure 127 (height) by 101 by 198 cm. (50 by 40 by 78 inches) and to weigh 250 Kg. (550 pounds). Crated for foreign or domestic shipment, it makes three boxes weighing altogether 455 Kg. (1,000 pounds). It requires a source of 60 cycle alternating current at 110 volts and draws a maximum of 2,400 watts (20 amperes). The frequency of oscillation can be adjusted to from 0 to 30 times per minute.

McKesson Respiraid Rocking Bed

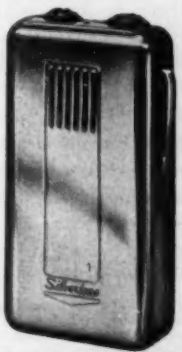
Evidence obtained from several acceptable sources led the Council to conclude that the rocking bed is useful but that hospitals should not be encouraged to purchase the apparatus with the idea that it is suitable for use in every type of emergency calling for artificial respiration. There was general agreement as to the value and limitations of this device. It does not take the place of the tank respirator but can be used as a means of weaning patients away from the tank respirator. The Council on Physical Medicine and Rehabilitation voted to include the McKesson Respiraid Rocking Bed in its list of accepted devices with the understanding that the manufacturer will not represent it as complete equipment for handling all types of respiratory failures.

SILVERTONE HEARING AID, MODEL M-35, ACCEPTED

Manufacturer: Micronic Company, 727 Atlantic Avenue, Boston 11.

Distributor: Sears, Roebuck & Company, 925 South Homan Avenue, Chicago 7.

The Silvertone Hearing Aid, Model M-35, is an electric device differing from the Micronic Model 101 (Council-accepted) only in the exterior etching and front grille design. Excluding the clothing clips and the projecting controls, it measures 105 by 58 by 22 mm. With batteries, receiver cord and receiver, it weighs 186.5 Gm. Evidence from sources acceptable to the Council showed that this device was satisfactory in construction and performance. The Council on Physical Medicine and Rehabilitation voted to include the Silvertone Hearing Aid, Model M-35, in its list of accepted devices.



Silvertone Hearing Aid Model M-35

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IONIZING RADIATION AND BLOOD-FORMING TISSUES

Since Heineke's pioneering research 35 years ago, it has been known that the blood-forming tissues are extremely sensitive to ionizing radiations.[1] Studies on normal laboratory animals exposed to a single dose of whole body irradiation in the LD_{50} range (dose required to kill one-half the animals exposed within a period of 28 days after irradiation) have shown that the bone marrow and the lymphatic structures go through the following phases: (1) destruction characterized by disintegration of cells, (2) active phagocytosis of the cellular debris, (3) atrophy, during which free cells are absent or at a minimum, and, finally, (4) regeneration. In rabbits exposed to a single dose of 800 r total body irradiation, phases 1 and 2 usually are completed within 24 hours, phase 3 (atrophy) may persist to or beyond the tenth postirradiation day but phase 4 (regeneration), though sometimes beginning as early as the eighth or tenth day, may not be complete for three weeks or even longer.[2] In the bone marrow, complete recovery usually is prompt. Erythrocyte, thrombocyte and granulocyte precursors in the marrow may reach or exceed normal by the fourteenth postirradiation day, and in the peripheral blood this repair is reflected by a normal or even an increased number of reticulocytes, thrombocytes and heterophils (neutrophils in man). In the lymphoid tissue, however, though there is some diffuse regeneration in the first two weeks following irradiation, complete recovery is slow, lymphatic nodules in the lymph nodes and white pulp of the spleen being not yet normal by the fourteenth day and the number of lymphocytes in the circulating blood remaining below normal for 30 days or more. It has been assumed that free cells are restored to the atrophic hematopoietic tissue by regeneration homoplastically from a few scattered surviving free cells and heteroplastically from fixed cells, such as those of the reticulum, and that it is suppression of these restorative processes that accounts for delay in regeneration of marrow and lymphatic tissue. Some investigators believe that delayed repair is caused by direct irradiation damage to reticular cells or surviving free cells, while others maintain that the delay is caused indirectly by the general toxicity or specific toxicity of radiation injury to the body as a whole.

Jacobson and his associates have reported that, in mice exposed to total body irradiation of 1,025 r, mortality is strikingly reduced and regeneration of the hematopoietic tissue is complete within eight days if the spleen has been surgically exteriorized and shielded from irradiation with lead. Without such shielding, this dose kills all the animals within 13 days and their hematopoietic tissues show little or no regeneration. In rats the shielding of the spleen or in rabbits of the spleen or the appendix reduces to one week or less the time required for regeneration of marrow and lymphatic tissue following exposure to 800 or 1,000 r of irradiation. Several explanations are offered: 1. The sparing of this amount of lymphatic tissue may reduce the general "radiation toxicity." 2. The lymphatic tissue that remains intact by virtue of shielding may supply humoral stimulation to hematopoietic tissue that is damaged by irradiation. 3. Cells from the intact lymphatic tissue may seed or colonize the damaged hematopoietic tissue. 4. Irradiation of the spleen and appendix may produce agents capable of suppressing regeneration of hematopoietic tissue, and the avoidance of irradiation of these organs prevents the production of such agents.

Radiologists long have known that subtotal body irradiation produces a briefer and less profound hematologic suppression than does total exposure of the body. They have noted, also, that the suppression is greater for some body parts than for others and that irradiation of the spleen alone in cases of myelogenous leukemia may be followed by sharp reduction of circulating leukocytes and the disappearance of cutaneous lesions. There have been numerous attempts to demonstrate in nonirradiated tissues of experimental animals inhibition or destruction produced indirectly by irradiation of other parts of the body, but the results have been negative or, at most, equivocal. Jacobson and his group [3] appear to be the first to have investigated the reverse situation, namely, the effect of nonirradiation of certain tissues, such as the spleen, on heavily irradiated tissues elsewhere in the body.

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2. Jacobson, L. O.; Marks, E. K.; Gaston, E., and Block, M. H.: The Effects of Nitrogen Mustard on Induced Erythroblastic Hyperplasia in Rabbits, J. Lab. & Clin. Med. **34**: 902, 1949. Bloom, W.: Histopathology of Irradiation from External and Internal Sources, National Nuclear Energy Series, Manhattan Project Technical Section, New York, McGraw-Hill Book Company, 1948, vol. 221, division 4. Dunlap, C. E.: Effects of Radiation on the Blood and the Hemopoietic Tissues, Including ing the Spleen, the Thymus, and the Lymph Nodes, Arch. Path.: **34**: 562 (Sept.) 1942.

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The fact that the sparing of the spleen (which weighs only 1/2000 as much as the entire body of the rabbit) enables the heavily irradiated lymphatic tissue of the animal to be well on the way to recovery within four days indicates that the responsible factor or factors are potent and prompt acting and suggests that the agent may be a humoral factor supplied by the intact splenic tissue. If this proves to be the case, then perhaps the agent can be isolated, identified and eventually made available for the treatment of excessive exposure to ionizing radiation.

ACCIDENT PREVENTION IN CHILDHOOD

Dr. Dietrich, in a contribution to this issue of THE JOURNAL (page 1175), calls attention to the brilliant accomplishments in the last half-century in the fields of public health and preventive medicine with resulting dramatic reduction in the mortality and morbidity of most infectious diseases and to the contrasting essentially unchanged death rate from accidents. The situation reflects lack of information on the part of the laity and some apathy on the part of the medical profession. The lack of interest in the subject is the result not so much of inadequate information as of insufficient emphasis. THE JOURNAL has recently devoted two current comments on the subject. One of these [1] cited figures from the National Office of Vital Statistics: of 32,960 deaths from all causes in 1946 among persons 5 to 19 years old, 37 per cent (12,342) were caused by accidents, as compared with 35 per cent in 1945 and 34 per cent in 1941. The conclusion is inescapable that the greatest problem in preservation of lives of children is accident prevention.

According to Dr. Dietrich the problems of poliomyelitis, heart disease, cancer and tuberculosis in children are dwarfed by the physical and emotional devastation brought by juvenile accidents. In one year 12,500 children were killed by accidents. The number of children who were permanently crippled is not known, but Dr. Dietrich would place it at about 50,000 annually.

Dr. Wheatley [2] states that not only do accidents kill more children after infancy than does any single disease but, in the ages from 1 to 14, inclusive, accidents take as many lives as pneumonia, diarrhea and enteritis, measles, diphtheria, meningitis, poliomyelitis, whooping cough and scarlet fever combined. According to Clark,[3] the important causes of death due to diseases in the United States in the 1 to 14 year groups are pneumonia, congenital malformations, tuberculosis, heart disease and cancer. However, in numerical importance all these rank far below death from accidents. To cite one example, Dr. Clark states that the death rate from diphtheria for all ages has been reduced from 40.3 per 100,000 population in 1900 to 0.6 per 100,000 in 1947. In this same interval the death rate from accidents has fallen only from 72.3 in 1900 to 69.4 in 1947.

In the prevention of accidents it is worth taking note of the fact that some children are accident prone. This may have something to do with the accident proneness of their parents and with psychological problems in the children themselves. Psychiatric counseling is advisable in such cases.

Recent contributions to the subject emphasize that accidents do not happen but are caused, and since they are caused they can be prevented. Dr. Dietrich introduces a new idea into the subject of accident prevention in children. This theory emphasizes the reciprocal relation of protection and education related to a child's age. Prevention of a particular type of accident must employ varying protective and educational pressures at different ages. During the first year of life the prevention is protection: the infant should not be dropped or allowed to fall. The protection must be 100 per cent. As soon as the infant becomes ambulant the problem is more complicated. Here one must add to protection education against accident. The ultimate mediators of any accident prevention program in childhood are the parents. Children past the age of 1 year should be exposed to the educational value of minor painful experiences. The 1 to 5 year age period is the critical one so far as death and crippling are concerned.

A certain amount of discipline, Dietrich emphasizes, is valuable in the educational aspect of accident prevention. Discipline should play an important role not only in accident prevention but in character building of a child by enabling him to obtain a sense of security.

All workers in the field of prevention of accidents to children emphasize that the responsibility for the distribution of information to parents rests primarily on the medical profession. Specific information on the subject of accident prevention in children can be obtained from booklets published by several of the leading insurance companies. The importance of the problem was reflected in the discussions of the recent meeting in Chicago of the American Academy of Pediatrics. Dr. George M. Wheatley of New York was appointed to head a new committee that will attempt to reduce the number of accidents among the children of our nation. In the final analysis, it is the general practitioner who can contribute most to this subject, for it is he who should advise the parents on all matters pertaining to the health and safety of children.

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2. Wheatley, G. M.: Editorial: Child Accident Reduction: A Challenge to the Pediatrician, Pediatrics **2**: 367 (Sept.) 1948.
3. Clark, E. B.: Leading Causes of Childhood Death, California Med. **73**: 22 (July) 1950.

ASSOCIATION OF MILITARY SURGEONS

Fifty-nine years ago, Nicholas Senn, a great surgeon, founded the Association of Military Surgeons of the National Guard. Dr. Senn, at that time Surgeon General of the Wisconsin National Guard, became the first president of this association. A few days ago in New York, the fifteenth president to be elected from the National Guard, Col. William Triplett of Baltimore, presided at the annual meeting and in his presidential address made a plea for physicians to offer their services to the National Guard. Colonel Triplett, who has devoted much of his life to this organization, knew of one regiment of the National Guard, whose history goes back to the Revolutionary War, that today has not a single doctor on its roster. The National Guard is important to the defense of this country, but its organization cannot be efficient or complete without the assistance of medical officers.

A brief review of the program at the New York annual meeting indicates the scope of activities this association now assumes. The opening session was privileged to hear representatives of the Army, Navy, Air Force, Public Health Service and Veterans Administration. The Director of Medical Services of the Department of Defense, Brig. Gen. Richard L. Meiling, pointed out that the military services should be able to provide the best medical services with a smaller ratio of physicians than was in use in the last great war. The Surgeon General of the Army, Major Gen. Raymond W. Bliss, who recently returned from Korea, reported that the medical services were doing an excellent job there under most difficult circumstances and that the mortality rate among the wounded was even less than in World War II. There was little serious disease among the troops. The Secretary General of the World Medical Association and Chairman of the Board of Trustees of the American Medical Association, Dr. Louis H. Bauer, reviewed some of the work which the World Medical Association has already accomplished and has under way. According to Dr. Howard A. Rusk, professor of physical medicine and rehabilitation, New York University—Bellevue Medical Center, the increasing average age of the population and the hazards inherent in present day living pose, perhaps, the greatest medical problem of the future in the field of rehabilitation. The present custom of retiring employees at a certain age, he said, is wasteful and deprives the nation of much of the wisdom that comes from experience. Dr. Rusk cited the recent retirement of the president of the largest corporation in the world and the almost immediate appointment of this executive to serve as ambassador in one of the most difficult positions of that kind. He recalled that the commander-in-chief of the Far Eastern forces is well past the customary retiring age and yet is vigorously prosecuting the war in Korea. The present system of having coroners determine the causes of sudden death was shown by Dr. Alexander Goettler, toxicologist to the Chief Medical Examiners Office of New York City, to be inadequate. Interesting cases of erroneous causes of death thus assigned revealed the need for thorough examinations by trained toxicologists in many cases of sudden death.

Capt. Lloyd R. Newhauser, U. S. Navy, in discussing a blood program in a national emergency was not in favor of mass blood grouping. When this method was tried on a large group in the Navy, he said, the errors amounted to about 10 per cent. The problems confronting the Council on National Emergency Medical Service of the American Medical Association were discussed by Dr. James Sargent, Council Chairman. These are derived from the necessity for planning for adequate military and civilian defense and from the Korean situation with respect to the procurement of physicians. Even the recently passed "doctor-draft law," while effective throughout the present program of expanding troop strength, is not a lasting answer to the needs of the Armed Forces for doctors. Special effort should be made by the medical schools, he said, to interest students in military medicine. Dr. Sargent proposed that machinery be set up through which those who are going into the service may be assured that their profession is genuinely interested in them, will give them council, will hear their complaints in confidence and will rectify them if just. He suggested that interested parties both in and out of service jointly help to accomplish a sensible revision of the whole system of our reserves. That, he said, calls for careful planning, in which there is "large room for civilian help."

The use of anticoagulants in military medicine and the selection of antibiotics for medical and surgical patients were discussed by Dr. Irving S. Wright, professor of clinical medicine at Cornell University, and Dr. Chester S. Keefer, professor of medicine, Boston University School of Medicine, respectively. Dr. William Stroud, professor of cardiology, University of Pennsylvania Graduate School of Medicine, interested the audience with his optimistic views of the treatment and prognosis of cardiovascular diseases.

Commanding officers sometimes pay a heavy price when they fail or refuse to follow the recommendations of the medical department. This fact was emphasized by Dr. Perrin H. Long, professor of preventive medicine at Johns Hopkins, who showed graphically the enormous increase of malaria in an armed force in Africa when troops, which had not followed the prophylactic measures recommended, entered certain malarial areas. This situation would be particularly distressing should the commanding officers themselves happen to be faddists or refuse to follow the recommendations of the medical department. Thus, the service of a large body of fighting men may be lost for a time. A supplementary report on dimenhydrinate (dramamine®), the surgery of World War III and the cold war were discussed by Dr. Leslie N. Gay, associate professor of medicine at Johns Hopkins, Dr. William

MacFee, surgical director, St. Luke's Hospital, New York, and Paul Linebarger, professor of Asiatic politics, School of Advanced International Studies, Washington, D. C., respectively. Professor Linebarger said that politics is unscientific and is now in a state comparable to the backward state that medicine was in hundreds of years ago.

In addition, the aviation corps panel, the medical services panel, the nurse corps panel, the dental corps panel and the veterinary corps panel each had its own sessions. Col. Amos R. Koontz, professor of surgery, Johns Hopkins University School of Medicine, Baltimore, chairman of the program committee, is to be congratulated on arranging an excellent program.

The Association of Military Surgeons in the United States, which began as a National Guard organization, has expanded its membership to include the other uniformed services; to the annual meetings also come representatives from many of our neighboring countries. Its aims are to increase the efficiency of the medical services both in peace and war, to preserve lessons learned the hard way, to create new ideas for the better care of the sick and wounded and the prevention of epidemics. This middle-aged association is indeed vigorous. It welcomes new members to help keep it so.

COCKROACH VECTORS OF VIRUS DISEASE

Experimental evidence suggesting that under certain conditions cockroaches may serve as vectors of polioencephalomyelitis group viruses is reported by Syverton and Fischer [1] of the departments of bacteriology, universities of Minnesota and North Dakota.

Adult cockroaches were strapped to corks with adhesive tape. By means of a tuberculin syringe with a blunt needle, each cockroach was given a single feeding of 0.2 cc. of a 10 per cent suspension of brain tissue from a mouse dying from encephalomyelitis. The diet thereafter consisted of fox chow and water. Fecal specimens for each 24 hour period were collected daily.

Each 24 hour fecal sample was made up separately into a 1 per cent emulsion in saline solution containing 500 units of penicillin and 100 micrograms of streptomycin per cubic centimeter. After standing at room temperature for 30 minutes, each specimen was centrifuged, and 0.03 cc. of the supernatant fluid was injected intracranially into a normal 21 day old white mouse. Control injections were made with fecal material from normal cockroaches.

For each of the first six consecutive days after the experimental feeding the fecal suspensions contained sufficient virus to paralyze and kill mice in two to four days. On and after the seventh day, results of the tests were negative. All control mice remained normal.

Because of the gregariousness, longevity and nocturnal habits of cockroaches, and the intimacy and constancy of their association with the food and excreta of man and animals, this experimental evidence is of suggestive clinical interest.

AN ANTIBIOTIC FROM RED BLOOD CELLS

Whitney [1] and associates of the Department of Preventive Medicine, University of Texas, report the preparation of a new antibiotic from human red blood cells, which is active against a wide range of gram-positive and gram-negative bacteria. Recognition of antibiotics of animal origin is not new. As early as 1945, Konikova [2] of the Soviet Union prepared bacteriostatic extracts of rabbit liver and human placenta. Bloom,[3] Waksman [4] and others afterward isolated antibacterial peptides from other animal tissues. One of them was named "erythrin," since it was prepared from red blood cells. Pavan [5] of Italy afterward prepared antibacterial extracts from the tissues of helminths, arthropods, molluscs, fish, amphibia and reptiles.

To prepare the blood antibiotics the Texas biochemists drew blood samples from men, cattle, dogs, rabbits and chickens. These blood samples were allowed to coagulate. The clots were then separated from the serums, triturated in distilled water and lyophilized. The desiccated material thus obtained was suspended in phosphate buffer solution containing trypsin and incubated for five hours at 37 C. The digest thus obtained was then inactivated by heating to 65 C. for 30 minutes. Similar hydrolysates were made from commercial bovine hemoglobin powder. The resulting clear dark brown tryptic digests were tested quantitatively for antibacterial properties by spot dilution methods on glucose agar plates.

With the bovine blood antibiotic the tests showed complete growth inhibition for such organisms as Staphylococcus aureus, Sarcina lutea, Streptococcus viridans, Bacillus anthracis and Escherichia coli. There was a slightly less pronounced inhibition with human and canine blood antibiotics. Only partial inhibitions were recorded with chicken antibiotic. These antibiotics were nontoxic even when repeatedly injected intra-abdominally in large doses into mice or guinea pigs.

The antibacterial substances derived from erythrocytes resist exposure to 120 C. for 15 minutes at a p_H range of 7.8 to 9.0. At p_H 5.5 or lower they are precipitated. The authors believe that the active principle in blood antibiotics is a peptide-amino acid complex. Its relation to conventional immunity mechanisms has not yet been determined.

1. Syverton, J. T., and Fischer, R. G.: Proc. Soc. Exper. Biol. & Med. **74**: 296 (June) 1950.

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4. Waksman, S. A.: Microbial Antagonists and Antibiotic Substances, New York Commonwealth Fund, 1947, p. 415.
5. Pavan, M.: Ricerca scient. e ricostruz. **19**: 1011, 1949.

THE PRESIDENT'S PAGE

A MONTHLY MESSAGE

As a result of the broadening sphere of influence of the American Medical Association in public affairs that affect the physical and economic well-being of the country, the President of the A. M. A. often has questions put to him by the press that are questions of public policy, rather than medical or scientific inquiries. One of the national press associations recently submitted a series of questions to me—some of which I would like to share with the readers of THE JOURNAL, as both the questions and my answers touch on matters of importance to our profession.

Here are a few of the questions and answers:

Q. Were doctors and/or their wives active in the election campaign?

A. The American Medical Association has not engaged in partisan politics for the election or defeat of individual candidates, but tens of thousands of doctors and their wives, acting as individual citizens, undoubtedly played a vital part in the recent elections. We believe this has been a healthy thing for the whole country and the medical profession would have been derelict in its duty if doctors had not fought for their convictions at the polls. It is paradoxical and somewhat amusing that those who now complain that doctors are too active politically were complaining just as loudly, only a few years ago, that the medical profession failed to take a proper interest in elections and public affairs. Undoubtedly one of the reasons that the medical profession was singled out as the first objective of those in the government who were determined on a program of socialization was that the advocates of Socialism felt that physicians could not or would not defend themselves when brought under attack. Fortunately, they erred in that diagnosis.

Q. Is the A. M. A. planning to "tone down" or intensify its drive against the Truman compulsory health insurance program?

A. There is no disposition on the part of American medicine to relax its vigilance or to relax its campaign against socialized medicine until the issue is finally resolved. The doctors of this country feel that there would be serious deterioration of medical care, endangering the health of the whole nation if physicians were regimented under political domination, and there will be no let up in medicine's fight so long as the danger exists. The American Medical Association also feels that the socialization of medicine in this country would be an irrevocable step toward a controlled economy and state socialism, which would affect not only physicians but people in every field of endeavor. We are determined to play our part in defending not only medical freedom but freedom for all Americans, and we are very proud of the role that doctors have played in awakening the American people to the seriousness of the trend toward socialization in this country.

Q. When and where do you look for the next big fight to come on this issue (socialized medicine) in Congress?

A. The Truman Administration, rather than American medicine, undoubtedly will determine what course the fight in Congress will take. So long as Federal Security Administrator Oscar Ewing remains in office, undoubtedly there will be continued efforts by his agency to enact compulsory health insurance in one form or another, but your questions in this regard probably should be directed to Mr. Ewing, rather than to us.

Q. Are doctors satisfied with the election results?

A. The returns of the November election were, in many respects, very reassuring to the medical profession, because they clearly demonstrated that those in the government who are urging that we follow in the footsteps of the Socialist government of Britain are out of step with the American people. We do not believe, however, that there is any cause for overconfidence or relaxing of vigilance. Both Mr. Ewing and the compulsory health insurance program that he advocates received a "thumbs down" verdict from the American people. But whether Mr. Ewing and his associates will accept the mandate of the people and admit that compulsory health insurance is looked on with disfavor by the majority of the people, we have no way of knowing. Again, perhaps you should ask Mr. Ewing. He may have some other explanation for the defeat of many members of the Congress who were outstanding exponents of his program of socialized medicine.

There were a good many other questions propounded, but most of them were the questions which many of you are asked constantly and which you can readily answer. One of the interesting aspects of all this to me is that there is a growing appreciation on the part of the press and national leaders that doctors have become alert, aggressive citizens—and that they are interested in the well-being of the country, as well as the health of their patients. We have our critics, of course, who feel embittered because we have successfully opposed those who had hoped to ride roughshod over the medical profession. But we have a new, fine group of friends, all over this country, who respect and admire us because we refused to accept the defeatist doctrine of the inevitability of government-controlled medicine—and struck out against it.

In this holiday season, as we near the end of the old year and face the problems and challenges of 1951, we have much to be thankful for, because we have earned a new measure of public confidence and public esteem, which is a great safeguard against those who would strip us of medical freedom. But because of the warm support we have achieved, we also have a great responsibility to the people of this country.

I would like to close this column by repeating as my pledge for the New Year, several lines from the Presidential Oath of Office that I took in San Francisco last June:

"I shall dedicate myself and my office to improving the health standards of the American people and to the task of bringing increasingly improved medical care within the reach of every citizen. I shall champion the cause of freedom in medical practice—and freedom for all my fellow Americans."

I hope every doctor will take that pledge with me.

ELMER L. HENDERSON, M.D.
Louisville, Ky.

WASHINGTON NEWS

(From the Washington Office of the American Medical Association)

Decentralization of Commissioning Authority

The Army has announced a speed-up of its procedure for granting reserve medical commissions. It amounts to a decentralization of commissioning authority, with Army area commanders in this country and overseas commanders authorized to grant commissions without reference to Army headquarters in Washington. The changes will be of greatest importance to registrants under the doctor-draft, who face the possibility of involuntary induction and loss of the $100 per month pay bonus. At the time the registrant reports for his physical examination he will be given an opportunity—the last as far as the Army is concerned—to apply for a reserve commission as a volunteer. If he accepts, his records will go immediately to the appropriate Army commander, who will determine the registrant's qualifications and mail him a letter of appointment if he is acceptable. The physician is instructed to take the oath of office within 72 hours of receipt of this notice. Then he is to notify his Selective Service Board of his commission. When the board is so informed, Selective Service will cease to process him for induction. If registrants take advantage of this system, the Army will complete its processing after the commissioning. The man will not be assigned to active duty until all regulations have been complied with, but meanwhile he will be assured a volunteer's status and the pay bonus. In the case of registrants who persist in refusing to accept commissions, records will be returned to their draft boards, rather than sent to Army commanders, when they complete their physical examinations. Draft boards then will list them as eligible for involuntary induction to meet calls from the armed services.

Physical Fitness of Reserve Officers

The Federal Register of November 21 carries detailed regulations covering appointment, reappointment and retirement of all Army reserves, including medical. The document may be purchased by sending 15 cents to the Superintendent of Documents, Government Printing Office, Washington, D. C. The regulations cover, in addition to physicians, medical service officers, nurses and medical technicians. For men now enrolled in the reserves, the regulations have this to say about maintenance of physical fitness: "The maintenance of physical fitness is largely an individual responsibility, particularly with reference to remedial defects. Each officer has a definite obligation to maintain himself in good physical condition in order that he may perform his duties efficiently. Each individual, therefore, should seek timely medical advice if he has reason to believe that he has a physical defect which affects or is apt to affect his physical well-being." Physical examinations by civilian physicians are authorized, but in this case the reserve officer himself must pay for the examination. As in the past, periodic physical examination of all reserve officers will be scheduled only when funds are available.

The New Congress

When the new congress meets, the administration will lose strength in committees as well as in total membership of House and Senate. For routine operations this is of little consequence. However, in the case of highly controversial legislation that has administration backing, the difference of one or two votes in a committee often is decisive. The realinement, which will be worked out in conference of party leaders in the next few weeks, might prove significant in several committees that handle almost all legislation of a medical or health nature. In the House, the Democrats will have no more than 236 votes, a loss of 24 votes for most roll calls. This should mean additional Republican seats on all large committees, including Armed Services, Expenditures in the Executive Departments and Interstate and Foreign Commerce. In the next two years all these committees will be handling legislation important to the medical profession. The armed services committee will consider extension of the doctor-draft and all other medical legislation involving the military services. The Expenditures Committee will hold hearings on government reorganization plans, including the proposal to make the Federal Security Agency into a cabinet department, if Mr. Truman again presses for this plan. The bulk of medical legislation—including national health insurance—comes within the province of the Interstate and Foreign Commerce Committee. In the Senate, about the same situation exists. There Republicans are in line for more voting power on such medically important committees as Labor and Welfare, Expenditures in the Executive Departments and Armed Services. At this stage speculation on individual committee assignments would be futile. Because in general House members are allowed to serve on only one major committee and senators on two, a great d. of shuffling and reshuffling will be required. There is a possibility that the session will be well under way before final committee lists are announced.

AEC Division of Biology and Medicine

Emphasis on civil defense planning is turning more attention toward the Atomic Energy Commission's Division of Biology and Medicine. The division has three broad fields of responsibility. It is expected to stimulate peacetime medical research through the use of radioactive substances, to devise technics for protecting the health of all persons working with radioactive material and to learn everything possible about the effects of atomic bombs on humans, animals and plants. Budget figures support the claim that the division is not expanding for expansion's sake. Although this year's appropriations for biology and medicine increased 26 per cent over last year's, the total AEC budget increased about 50 per cent. Division officials expect that their outside grants will level off at a figure only slightly in excess of this year's total, the actual rate depending largely on getting additional areas of research declassified. Once declassified, projects are open to any researcher. While in the secret classification, work must be carried on by AEC personnel or others who have undergone security checks. Although the division expects to continue to give general direction to research work, its primary responsibility narrows with each decision to declassify a certain project or phase of research.

For a time, the emphasis on security interfered seriously with AEC's research grants program. The National Research Council at first refused to administer the program as long as these restrictions prevailed, but now it is assisting to the extent of evaluating candidates. AEC's own Oak Ridge organization now administers the grants program. Unlike most government grant programs, the amount of money going to individual researchers and projects is not announced, although names of recipients are. AEC officials say the main reason for this secrecy is to avoid disclosing the primary research objectives. During the last full fiscal year, AEC invested about $17,500,000 in biologic and

medical research. half for "on site" work in its own installations and the remainder as grants to outside researchers. A substantial share of the latter went for cancer research. AEC also sponsors a limited cancer research program at its own installations, including a 30 bed hospital at Oak Ridge.

The Medical Advisory Committee (Dr. Alan Gregg of the Rockefeller Foundation, chairman) does not allocate money but surveys progress in projects and makes recommendations as to fertile areas for investment of funds. It was a recommendation of this committee, incidentally, which recently caused AEC to step up its interest in the effect of radiation on the enzyme system. AEC's program for distribution of radioisotopes has brought the organization into direct contact with most large hospitals and schools. Isotopes are sent out at below cost—the $10 fee only helps to cover shipping costs. Because of this low cost, as well as other important advantages, the increasing use of isotopes is phenomenal. Domestic distribution the first six months of this year totaled 2,395, or 36 times that for the same period the previous year. Radiocobalt, particularly, is in great demand, and AEC officials expect that eventually it will completely replace radium in the treatment of cancer. The Isotopes Distribution Advisory Committee (Dr. G. Failla, Columbia University, chairman) must review all initial applications where the isotopes are intended for use on human beings. It also passes on other types of applications, but only when they are submitted to it by the commission.

In protection of personnel from excess radiation, the medical division and other groups associated with it have an almost perfect record. In the four years AEC has managed the program, there have been no deaths from radiation and only five injuries. Much of the work in this field is carried on by the Bureau of Standards in cooperation with AEC.

Although there have been no sensational discoveries, AEC is continuing its search for a specific treatment for radiation. One of its projects has established that aureomycin will decrease the mortality rate in rats and dogs exposed to lethal and near-lethal doses of radiation, and another, that a lead shield around the spleen will reduce the death rate of other experimental animals similarly exposed. Another project has shown that animals that inhale air composed largely of nitrogen prior to exposure may be expected to survive an otherwise lethal dose. Obviously this is just a start; out of this and other basic knowledge about radiation, researchers still must find a clew to a cure. Looking back on progress already made, AEC officials are sufficiently optimistic to state, "We are reasonably confident that eventually protection will be possible against midlethal doses and higher."

Cancer Control Facilities

The National Cancer Institute has issued a complete state by state and city by city summary of cancer control facilities, by far the most complete document yet assembled on the subject. The booklet is "Cancer Services and Facilities" (Public Health Service Publication no. 14) and is for sale by the Government Printing Office for 35 cents. It is intended as a source book, "particularly for those engaged in cancer control work or other activities affecting the cancer patient."

For each state the following information is supplied: citation of legislation under which state programs operate; agency in charge of program, its location and the name of its director; population statistics, including breakdown of white and non-white groups and of age groups; total number of cancer deaths for 1948 and breakdown of cancer locations; funds available, and source, for cancer work in that state; number of physicians and hospitals and hospital beds, and a description of special cancer facilities offered by that state. Following this, cancer clinics are listed by communities. Illinois, for example, has 46 cancer clinics, 20 of them located in Chicago and the rest in 24 other towns and cities.

The report underlines the extreme variation in sources of income for the programs as well as wide variation in the programs themselves. Because of large sums spent by some states for maintaining cancer hospitals and university research, an average for federal-state contributions would not be valid. However, here are some random examples of how the official programs are supported (all figures for the current fiscal year): Alabama is getting $77,353 from the federal government but is itself spending more than twice that; Connecticut is spending $83,230 of its own funds and collecting less than half that from the federal government; for every federal dollar Florida is getting, it is spending about six of its own; in Illinois, the ratio is about three federal dollars for every state dollar; Iowa spends almost seven federal dollars on cancer for each state dollar; Louisiana's ratio is about the same; Maryland is one of the states that operates on a relatively small federal allotment ($43,950) but spends no state money; Michigan is getting $123,095 from the federal government for its cancer program and is spending $9,360, a ratio of between 13 and 14 to one; Missouri is far at the other end of the scale, collecting $98,091 but spending $405,500 of its own funds; Delaware, likewise, finances most of its program, spending $50,000 as against $6,482 from the federal government. (All figures are from the Public Health Service report.)

Notes

A Defense Department spokesman says two factors helped to ease the demand for physicians: (1) an overestimate of casualties from the Inchon and Wonsan landings in Korea and (2) the Veterans Administration's action in agreeing to withdraw all but 790 of its patients from military hospitals. . . . Criticism of the doctor-draft has come from the Board of Regents, American College of Surgeons. In a letter to President Truman and top military medical officers, the board warned against waste of medical manpower and noted that casualties in the first four months of Korean fighting "were equal to only about one month's casualties in the United States from automobile accidents alone.". . . . The Federal Security Agency has announced that it is prepared to help Israel to control disease and in general strengthen her public health facilities. The program will come under Point Four. . . . Dr. Don E. Nolan has been appointed manager of the new VA hospital in Seattle. He has been chief of Professional Services at the VA Dayton office. . . . Opened: VA 475 bed hospital at Wilkes Barre, Pa. Dedicated: VA 200 bed hospital at Altoona, Pa. . . . VA's latest technic for speeding service to veterans is a method of making facsimiles of roentgenograms. All original roentgenograms will be stored at the VA's Philadelphia Records Center, where, on request, facsimiles produced at a rate of one per minute by a solarization technic will be sent to hospitals or doctors treating veterans. . . . Alabama is the first state to receive federal funds to assist the permanently and totally disabled, a contribution authorized by amendments to the Social Security Act. The federal allotment will allow Alabama to boost its monthly payments from an average of about $11 per person to about $20. . . . The Government Printing Office has on sale the "Biographical Director of the American Congress," a monumental effort containing the names of the 9,942 persons who served in Congress along with short biographies. The book (2,057 pages) is crammed with important as well as incidental information about Congress. . . . The latest Public Health Grants for cancer total $324,525 and are divided among 17 projects. Under one grant, patients with lung cancer at several Massachusetts hospitals will be interviewed on smoking habits, exposure to occupational hazards, previous lung diseases, hereditary background and possible air impurities in their environment. The hope is that the various factors contributing to lung cancer will be isolated.

ORGANIZATION SECTION

THIRD ANNUAL MEDICAL PUBLIC RELATIONS CONFERENCE

Hotel Statler, Cleveland

Sunday and Monday, December 3 and 4

THEME: "EFFECTIVE COUNTY SOCIETY PUBLIC RELATIONS"

PROGRAM

SUNDAY, DECEMBER 3

REGISTRATION

10:30 a. m., Euclid Room Foyer.

LUNCHEON

12:15 p. m., Euclid Room.

Toastmaster: DR. GEORGE F. LULL, Chicago, Secretary and General Manager, American Medical Association.

Address of Welcome
DR. GEORGE F. LULL

Keynote Address: Serve Your Profession Through Public Relations
DR. JOHN W. CLINE, San Francisco, President-Elect American Medical Association.

GROUNDWORK FOR A SUCCESSFUL PR PROGRAM

2:15 p. m., Euclid Room.

Chairman: DR. CLEO M. MILLER, Nashville, Tenn., President, Nashville Academy of Medicine.

Who Directs the Work?
DR. RUSSELL B. ROTH, Erie, Pa., Secretary, Erie County Medical Society.

Who Pays the Bills?
MR. ARTHUR P. TIERNAN, Evansville, Ind., Executive Secretary, Vanderburgh County Medical Society.

Finding the Sore Spots
DR. JOHN T. T. HUNDLEY, Lynchburg, Va., President-Elect, Medical Society of Virginia.

Building the Program
DR. CHARLES S. LAKEMAN, Rochester, N. Y., Chairman, Public Relations Committee, Monroe County Medical Society.

Enlisting the Membership
DR. R. B. CHRISMAN, Miami, Fla., Secretary, Dade County Medical Society.

Questions and Discussion.

SPECIAL SCREENING

4:30 p. m., Euclid Room.

Promotion Comments
MR. LAWRENCE W. REMBER, Assistant to the General Manager, American Medical Association

Screening of "Here's Health"
(Louis de Rochemont's new documentary film.)

CONFERENCE BANQUET

6:30 p. m., Euclid Room.

Toastmaster: DR. LOUIS H. BAUER, Hempstead, N. Y., Chairman, Board of Trustees, American Medical Association.

Introduction of Special Guests
DR. LOUIS H. BAUER

Salute to County Societies
DR. ELMER L. HENDERSON, Louisville, Ky., President, American Medical Association.

What the Community Expects of the Medical Profession
MR. LOUIS B. SELTZER, Cleveland, Editor, Cleveland Press.

MONDAY, DECEMBER 4

COUNTY SOCIETIES AND THE LEGISLATIVE SCENE

9:15 a. m., Euclid Room.

Chairman: DR. GUNNAR GUNDERSEN, La Crosse, Wis., Chairman, Executive Committee, Board of Trustees, American Medical Association.

The Legislative Committee and You
DR. DWIGHT H. MURRAY, Napa, Calif., Member, Board of Trustees, Chairman of Committee on Legislation, American Medical Association.

What's Ahead in Washington
DR. JOSEPH S. LAWRENCE, Washington, D. C., Director, Washington Office, American Medical Association.

Questions and Discussion.

ACTIVITIES WITH A PURPOSE

10:00 a. m., Euclid Room.

Chairman: MR. ROLLEN W. WATERSON, Oakland, Calif., Executive Secretary, Alameda County Medical Society.

A Family Doctor for Every Family
DR. EUGENE A. OCKULY, Toledo, Ohio, President, Toledo Academy of Medicine.

Community Health Projects
DR. FRED STERNAGEL, West Des Moines, Iowa, Chairman, Committee on Medical Service and Public Relations, Iowa State Medical Society.

PR Approach to Business Methods
DR. E. L. BERNHART, Milwaukee, President, Medical Society of Milwaukee County.

Working with Other Health Professions
DR. WILLIAM M. SKIPP, Youngstown, Ohio, Mahoning County Medical Society.

Promoting Voluntary Health Insurance
DR. CARL F. VOHS, Clayton, Mo., President, Missouri Medical Service.

The Doctor and Civilian Defense
DR. FREDERIC B. DAVIES, Scranton, Pa., Committee on Emergency Disaster Medical Service, Medical Society of State of Pennsylvania.

Questions and Discussion.

LUNCHEON

12:15 p. m., Grand Ballroom.

Toastmaster: DR. F. F. BORZELL, Philadelphia, Speaker, House of Delegates, American Medical Association.

What IS This American Way?
MR. R. W. MILLS, Fond du Lac, Wis., Executive Secretary, Fond du Lac Association of Commerce.

THE IDEA EXCHANGE

2:15 p. m., Euclid Room.

General Chairman: DR. G. A. WOODHOUSE, Pleasant Hill, Ohio, Secretary-Treasurer, Miami County Medical Society. (After remarks of the general chairman, conferees will assemble in three groups to take up separate medical public relations problems of small, medium and large communities.)

Group 1: Medical Public Relations in a Small Community (Under 100,000)

Discussion Leader: DR. G. A. WOODHOUSE.

Group 2: Medical Public Relations in a Medium-Sized Community (100,000-500,000)

Discussion Leader: DR. JOHN E. MCDONALD, Tulsa, Okla., Public Policy Committee Chairman, Oklahoma State Medical Society.

Group 3: Medical Public Relations in a Large Community (Over 500,000)

Discussion Leader: DR. ARCH WALLS, Detroit, President-Elect, Wayne County Medical Society.

4:15 p. m., Euclid Room.

Report of Discussion Group Chairmen.

4:45 p. m., Adjournment of Conference.

GOVERNMENT SERVICES

Navy

Edward Rhodes Stitt Library

The medical library of the Naval Medical School at the Naval Medical Center, Bethesda, Md., has been renamed the Edward Rhodes Stitt Library in recognition of Admiral Stitt's distinguished service in the field of tropical medicine and as Surgeon General of the U. S. Navy from 1920 to 1928. The principal speakers at the ceremony were Rear Admiral Morton D. Willcutts, commanding officer, Naval Medical Center, and Capt. Bartholomew W. Hogan, commanding the Naval Medical School.

Guest Lecturers

Dr. Waltman Walters, chief of surgery, Mayo Clinic, Rochester, Minn., opened the current series of guest lectures at the Naval Medical School, Bethesda, Md., September 29, when he discussed "Surgery of the Stomach with an Evaluation of Vagotomy." Dr. A. R. Shands Jr., Wilmington, Del., was the guest lecturer at the Naval Medical School, Bethesda, Md., on October 27. His subject was "Some of the Problems of the Hip in Childhood." These meetings are open to members of the local medical societies and faculties of local medical schools, as well as medical officers of the Armed Forces, Public Health Service, Veterans Administration and Indian Affairs Bureau.

Deputy Director of Institute of Pathology

Capt. Arthur W. Eaton (MC, USN) has been appointed Deputy Director of the Armed Forces Institute of Pathology, Washington, D. C. Captain Eaton's entire medical career has been in the field of pathology, with the exception of three years during World War II, when he served in the Pacific Area with the 7th Fleet, the Amphibious Training Command and the Third Amphibious Force. He was an instructor in pathology at the U. S. Navy Medical School in 1937 and subsequently was pathologist on the hospital ship *USS Relief* and at several Navy hospitals.

Personal

Lieut. Col. Theodore M. Carow (MC), deputy chief of the Armed Services Medical Procurement Agency in Brooklyn, has been promoted to the rank of colonel. The 43 year old Army doctor is the youngest officer ever to occupy the deputy chief's position at the agency.

Capt. Charles W. Lane (MC, USNR) on October 16 became director of the Bureau of Medicine and Surgery's Naval Reserve Division. Captain Lane has been in the naval service for over 33 years, nearly 20 of which have been on active duty. He was in private medical practice in San Diego for 14 years.

Public Health Service

Examination for Scientists

A competitive examination for appointment of bacteriologists, entomologists, parasitologists and protozoologists to the Regular Corps of the United States Public Health Service will be held February 12-14, 1951 at points throughout the United States. Applications must be received no later than January 15, 1951. Appointments will be made in the grades of assistant scientist and assistant sanitarian (equivalent to Navy rank of lieutenant, j.g.) and senior assistant scientist and senior assistant sanitarian (equivalent to lieutenant). While consideration is given to the officer's preference, ability and experience, all commissioned officers are subject to change of station and assignment as necessitate the needs of the service. Appointments are permanent in nature and provide opportunities for qualified bacteriologists to pursue their profession as a life career in the research and public health activities. The names of applicants who successfully complete the examination will be placed on a merit roll, from which appointments will be made to fill current and future vacancies. Candidates must be United States citizens and at least 21 years of age. Application forms may be obtained from the Surgeon General, United States Public Health Service, Federal Security Agency, Washington 25, D. C., Attention: Division of Commissioned Officers.

Research on Diabetes and Personality

The National Institute of Mental Health of the Public Health Service has made a grant of $7,884 for a three year study on the psychodynamics of persons with potential diabetes mellitus to be conducted at the May Institute for Medical Research, Cincinnati, under the direction of Dr. I. Arthur Mirsky. The announcement by the Public Health Service states that prediabetics can often be identified through their medical histories, and recent studies indicate that a person in whom diabetes develops has a personality structure different from that of the nondiabetic. The study will cover the mental, emotional and physical makeup of a group of prediabetics before they actually become ill. The announcement further states that the study may reveal the conditions related to the development of diabetes and, "it is hoped," may eventually help in the discovery of preventive measures. This grant was one of 21 new mental health research grants approved by Surgeon General Leonard A. Scheele on recommendation of the National Advisory Mental Health Council, which, in addition to renewal of 44 earlier grants, makes a total of $855,740 approved for mental health research.

Latin American Fellows

Ten physicians, nurses and other health workers from Latin American countries are in the United States for one year of advanced training under programs supervised by the Division of International Health of the Public Health Service. Fellowships for the training are provided by the Educational Exchange Act. Among the trainees are:

Dr. Alexander G. Cevallos, chief of Maternal and Child Health Services of the Health Department, Province of Manabi, Ecuador; to study treatment and control of tuberculosis at the Herman Kiefer Hospital, Detroit.

Dr. Alcides L. Conti, head of the Dermatology and Syphilology Clinic, Policlinical Hospital, La Plata, Argentina; to study dermatology and syphilology at New York University.

Dr. Jose Horowitz, neuropsychiatrist, Santiago, Chile; to study mental hygiene and public health at Johns Hopkins University.

Dr. Simon Markovich, head of the Department of Neurophysiology, University of Chile, Santiago; to study neurophysiology at Columbia University.

Dr. Jose Manuel Ortega, surgeon at the Huipulco Municipal Hospital; to study thoracic surgery at Fort Sanders Hospital, Knoxville, Tenn.

Dr. Jose Sosa, professor of bacteriology and immunology, National School of Biological Sciences, Mexico City; to study virus diseases and public health at the University of California, Berkeley.

MEDICAL NEWS

(Physicians will confer a favor by sending for this department items of news of general interest: such as relate to society activities, new hospitals, education and public health. Programs should be received at least two weeks before the date of meeting.)

CALIFORNIA

Jacob Gimbel Lectures.—Dr. Manfred S. Guttmacher, chief medical officer, Supreme Bench of Baltimore, delivered the Jacob Gimbel lectures under the auspices of Stanford University and the University of California November 27-December 1 at the Stanford University School of Medicine, Berkeley-San Francisco. The subject of this year's lectures was sexual offenses. Dr. Guttmacher spoke on the clinical aspects and treatment, medical and legal. He also spoke at both Stanford University and the University of California November 28-30 on the sexual offender.

Chronic Disease Program.—After two years of study by a committee organized by the Social Planning Committee of the Community Chest, funds have been secured from a private source and a director appointed to take the first steps in the pooling of resources to meet the needs of the chronically ill of San Francisco. Information will be made available through meetings, brochures and reports, and research information and occupational therapy, rehabilitation and home care programs will be planned. A sound working relation will be developed with physicians, hospitals, nursing organizations and nursing homes, the health departments and educational and civic groups. The Community Chest will serve as a disbursing agent and provide some services. Mrs. Helene M. Lipscomb, who has had experience with community services in California and eastern cities, is the director. Her office is at 2015 Steiner Street in the Community Chest Building. The telephone number is Walnut 1-7032.

COLORADO

Survey of Arkansas River Basin.—A survey to determine the extent and cause of pollution of the Arkansas River Basin was begun in October to bring up to date previously collected information and to publicize the need for treatment of domestic and industrial wastes. The study is a cooperative program of the Colorado State Department of Game and Fish and the State Department of Public Health. Temporary laboratory facilities will be arranged in Salida, Pueblo, La Junta, Trinidad, as well as in established laboratories in Denver, to conduct tests of samples of water taken the entire length of the river and its principal tributaries. Samples will be taken above each town, at the point of sewage outfall, at the point of induction of any industrial waste and below the town. Samples will be taken over a period of several months to obtain a true picture of the extent of stream pollution in the area of each community and industry.

ILLINOIS

Chairman of Cancer Society Committee.—Dr. Walter G. Maddock, Chicago, Elcock professor of surgery at Northwestern University Medical School, has been elected chairman of the Medical and Scientific Committee of the Illinois Division, American Cancer Society, Inc., for 1950-1951. The committee, composed of 52 Illinois physicians and scientists, is responsible for the division's medical and scientific policy, including research, education and service. It reviews all professional activities and projects and recommends appropriations to the executive committee of the society. Dr. Maddock also represents Northwestern University Medical School on the division's Professional Education Committee, which conducts cancer refresher courses with the cooperation of the medical schools of the universities of Chicago, Illinois and Loyola.

Chicago

Furniture Dealers Aid Cancer Research.—The Albert G. Joseph Cancer Research Foundation has presented a check for $25,000 to help support cancer research at the University of Chicago. The gift was presented at a dinner at the Stevens Hotel November 14. Speakers included Dr. Lowell T. Coggeshall, dean of the university's division of biological sciences, and Dr. James W. J. Carpender, assistant professor of radiology. The foundation, organized in memory of Albert G. Joseph, active in the furniture business in Chicago from 1911 until his recent death from cancer, is supported by contributions from more than 500 retail furniture men and dealers in allied businesses.

Grant Hospital Affiliates with University.—An affiliation has been arranged between Grant Hospital and the University of Illinois College of Medicine for the purpose of stimulating clinical teaching and organized research programs at both institutions. Members of the present staff at Grant Hospital will continue in their present capacities and new appointments will be correlated by the university and the hospital. The board of directors of Grant Hospital will retain all of its present authority over the administrative, physical and professional aspects of the hospital. The university will have representation on the board. The hospital has 236 beds for adult patients plus 45 bassinets. Grant also operates an outpatient clinic, which had 17,720 patient visits during 1949. Of that number, 10,296 visits were handled at no cost to the patient.

KENTUCKY

Research on Childhood Infections.—A virus research laboratory which will concentrate on childhood infections has been established at the University of Louisville School of Medicine. Its completion was effected by a grant from the recently organized Kentucky Child Health Foundation. The investigations will be supervised by Dr. Alexander J. Steigman and James G. Shaffer, Sc.D., of the school's child health and bacteriology departments.

Dr. Bortz Addresses Dinner Meeting.—At the monthly dinner meeting of the Jefferson County Medical Society in Louisville November 20, the guest speaker was Dr. Edward L. Bortz, associate professor of medicine, Graduate School of Medicine, University of Pennsylvania, Philadelphia, and Past President of the American Medical Association, whose subject was "Diabetes Today and Tomorrow." The address was sponsored by the Louisville Society of Physicians and Surgeons.

Crippled Children Society.—The annual meeting of the Kentucky Society for Crippled Children was held in Lexington November 10. At the morning session reports were given of projects initiated by the society. Lawrence J. Linck, executive director, National Society for Crippled Children and Adults, Inc., Chicago, addressed the luncheon meeting. At 2:30 p. m. the Honorable Earle C. Clements, governor of Kentucky, and other distinguished persons were guests of the society at the dedication of the new convalescent home one mile from Lexington.

MARYLAND

Personals.—Dr. Robert E. Bauer has been named medical director of the Sharp & Dohme Blood Donor Center in Baltimore. He has recently been a resident at University Hospital in Baltimore.

Society News.—The Maryland Society of Pathologists elected the following officers for the ensuing year: Dr. Harold L. Stewart, Bethesda, president; Dr. Carroll G. Warner, Baltimore, vice president, and Dr. Russell S. Fisher, Baltimore, secretary-treasurer.——Dr. John K. Lattimer, New York, addressed the fall meeting of the Urological Section of the Medical and Chirurgical Faculty of Maryland October 19 in Baltimore, on "Tuberculosis of the Urogenital Tract."

Dr. Ivy Delivers Friedenwald Memorial Lecture.—Dr. Andrew C. Ivy of the University of Illinois gave the fifth annual Dr. Julius Friedenwald Memorial Lecture on November 2 at the University of Maryland School of Medicine, Baltimore, on "Physiological Basis of the Psychosomatic Aspects of Peptic Ulcer." This lectureship was established at the university in 1941 in honor of Dr. Friedenwald, formerly professor of gastroenterology.

MASSACHUSETTS

New Division of Alcoholism.—An attack on the problem of the state's chronic alcoholics was launched November 16 with creation of a new Division of Alcoholism in the State Department of Public Health. On the same day the first of two clinics for rehabilitating alcoholics was opened under department sponsorship at the Peter Bent Brigham Hospital, Boston, and at the Quincy City Hospital. Director of the new division will be Dr. John C. Ayres of Brighton, at present assistant

director of the department's Division of Communicable Diseases. The new division's attack is aimed at (1) diagnosis, treatment and rehabilitation of persons addicted to the excessive use of alcohol, (2) prevention and education and (3) research in the medical and public health aspects of chronic alcoholism. The division will operate with a limited budget of $40,000 to cover costs until June 30, 1951. The division is expected to work in conjunction with other agencies, such as Alcoholics Anonymous, committees for education on alcoholism, church and other groups. The state's alcoholism rate ranks fifth in the nation. Dr. Vlado A. Getting, state health commissioner, declared that the cost to governmental agencies for incarceration of problem drinkers and care of their families is estimated by the legislative Commission on Alcoholism at $61,000,000 annually. In setting up the Division of Alcoholism, Massachusetts is following the lead of Virginia, New Jersey and Pennsylvania in treating alcoholism as a part of its general public health program. Governor Dever signed the bill providing for the state program on August 17.

MICHIGAN

Prenatal Clinic.—A clinic to provide antepartum care and home delivery for the medically indigent has been set up in Oakdale Gardens, an area where the death rate at birth is highest in Oakland County. It will serve about 15,000 persons and will be educational as well as medical, providing instruction for prospective mothers on how to care for themselves and their children. Located in Oakdale Community Center, the clinic will be open from 1:00 to 2:00 p. m. on Tuesdays and at additional times as the project becomes better known. Cooperating groups, brought together through the Council of Social Agencies, are furnishing funds and personnel. These groups include Family Service of Oakland County, Visiting Nurses, Federal Housing Authority, Oakland County Social Welfare Board, the state and county health departments and the U. S. Children's Bureau in Washington.

NEW MEXICO

Lovelace Foundation Clinic Dedicated.—Dedication ceremonies for the Lovelace Foundation's million dollar clinic building were held November 4 at Albuquerque. The state governor, both senators and more than 1,000 others attended. Among the speakers were Dr. Ward Darley Jr., dean, University of Colorado School of Medicine, Denver; Dr. Charles W. Mayo, Rochester, Minn.; Dr. George F. Lull, Secretary and General Manager, American Medical Association, Chicago; Senators Clinton Anderson and Denis Chavez, and Mr. Floyd Odlum, chairman, board of directors of the foundation. Open house was held at the new building after the dedication. Ground-breaking ceremonies for the 110 bed Bataan Memorial Hospital being built by the Methodist Church on ground adjoining the clinic also were held. The clinic is situated north of the Veteran's Administration Hospital, which is now completing a $3,200,000 addition that will bring its capacity to 591 beds. Members of the clinic staff act as consultants at the veterans hospital.

Construction of the four story building began in June 1949. Trans World Airlines has furnished a laboratory for respiratory and circulatory studies of pilots. The library contains more than 5,000 volumes as well as 250 medical and surgical journals. The Lovelace Clinic was founded in 1922. In 1947 it turned over its entire assets plus its future net income to the Lovelace Foundation for Medical Education and Research.

NEW YORK

Dr. Seed Promoted at Research Institute.—Dr. John C. Seed, formerly with the Army Chemical Center in Edgewood, Md., has been appointed executive assistant to Dr. Maurice L. Tainter, director of the Sterling Winthrop Research Institute, Rensselaer. Dr. Seed's duties include liaison between the institute and the medical profession. He interned at the Massachusetts General Hospital until entering the Army in April 1946. There he supervised and conducted research at the Army Chemical Center. On release from the service he continued similar duties as a civilian employee until his arrival at the institute.

Rochester Academy Anniversary.—The Rochester Academy of Medicine celebrated its fiftieth anniversary at a dinner at the Oak Hill Country Club in October. The speaker was Dr. George W. Corner, director, department of embryology, Carnegie Institute in Baltimore, who spoke on medical education and practice in the days of Benjamin Rush. Supplementing the program was a portrait exhibit by the Museum Committee in the foyer of the club. Included were large photographs of three doctors who formed the academy, William S. Ely, John O. Roe and Edward B. Angell, as well as a portrait of another founder, Dr. Louis A. Weigel, an early worker in the field of roentgen therapy.

Stockpile Medical Supplies.—A $500,000 emergency appropriation for the stockpiling of medical supplies and equipment for use in the event of enemy attack has been approved for use of the State Civil Defense Commission. The appropriation is expected to "stimulate the production of essential supplies," which will be primarily drugs and antibiotics. They are to be stored in strategically located state institutions. The state will purchase also surgical kits, blood transfusion sets, fracture supplies, burn treatment supplies, syringes and needles. The State Department of Health and the Civil Defense Commission will order and arrange for storage of the material. Staffs are now being trained for its use.

New York City

Hospital News.—Construction of several new units for Mount Sinai Hospital was announced in November with the letting of a contract totaling approximately $6,000,000. The buildings include the Berg Institute of Research, a maternity pavilion, a laboratory building and a new x-ray department, as well as alterations and additions to the existing hospital.

Named to Cancer Institute Board.—Detlev W. Bronk, Ph.D., president of Johns Hopkins University, Baltimore, and Rear Admiral Lewis L. Strauss, Washington, D. C., have been elected to the board of trustees of Sloan-Kettering Institute for Cancer Research. Dr. Bronk is president of the National Academy of Sciences, member of scientific directors of the Rockefeller Institute for Medical Research and serves on the committee of biology and medicine of the Atomic Energy Commission. Admiral Strauss, until recently a member of the Atomic Energy Commission, is president of the Institute for Advanced Study in Princeton and a member of the Naval Research Advisory Committee and the board of managers of Memorial Center for Cancer and Allied Diseases.

Postgraduate Radio Programs.—The sixth of the New York Academy of Medicine's FM radio broadcasts "For Doctors Only" will be initiated on December 7 at 9:00 p. m. over station WNYC-FM with an address by Dr. Cyril N. H. Long, dean, Yale University School of Medicine, New Haven, Conn., on "Pituitary-Adrenal Relationship." Other scheduled programs are as follows:

Dec. 14, Alexander B. Gutman, New York, Gout.
Dec. 21, Robert H. Kennedy, New York, Chairman, Roundtable: Sport Injuries.
Dec. 28, Joseph J. Bunim, Brooklyn, Clinical Effects of Cortisone and ACTH in Rheumatic Diseases.
Jan. 4, Charles A. Ragan, New York, Rheumatoid Arthritis: The Natural History of the Disease and Its Management.

The response to the broadcasts has been widespread and enthusiastic.

Medical Aspects of Compensation.—A course under this title is being presented by New York University-Bellevue Medical Center in collaboration with the American Academy of Compensation Medicine December 4-9 at Erdmann Auditorium from 1:00 to 4:00 p. m. and 7:00 to 10:00 p. m. The tuition is $25. The roundtables and their moderators are as follows:

Peripheral Vascular Problems in Compensation Medicine, A. Wilbur Duryee.
The Heart and Compensation Medicine, Cary Eggleston.
Radiology in Relation to Compensation Medicine, A. L. Loomis Bell.
Surgery in Relation to Compensation Medicine, Harry V. Spaulding and Francis B. Berry.
Gastrointestinal Diseases, Z. Taylor Bercovitz.
Genitourinary Diseases in Relation to Compensation Medicine, Robert W. Hunt.
Rehabilitation, Howard A. Rusk.
Occupational Diseases, Paul Reznikoff.
Problems in Practical Applications of Radiation and Radioactive Materials, Bernard S. Wolf.
Ophthalmology in Compensation Medicine, Conrad Berens.

Tuberculosis High in Manhattan.—The borough of Manhattan leads the city in tuberculosis mortality. The New York Tuberculosis and Health Association reports that during the first six months of 1950 about half (610) of the 1,264 deaths from tuberculosis in New York City were of residents of Manhattan. Of the 4,226 new cases of tuberculosis registered in the city during this period, 2,075 were in residents of Manhattan. In relation to the population of the various boroughs as just enumerated by the Census Bureau, the registration of new cases of tuberculosis in the City of New York during the first half of 1950 averaged 107.7 per 100,000 population. The average for Manhattan was 213.9. The cost of maintenance and care for victims of the disease in New York City is more than $34,000,000 a year. This figure ignores expenditures for relief and loss of wages by the adults who have been stricken. It also makes no allowance for the contributions made by a large number of physicians, especially tuberculosis specialists, who give their services free for the care particularly of patients in public institutions.

PENNSYLVANIA

Medical Careers Conference.—A total of 442 high school students attended a Medical Careers Conference at St. Vincent's Hospital, Erie, sponsored by the Erie County Medical Society November 8. Officers of the society outlined the purpose of the conference. Nursing was the subject attracting the largest number of students. A possible career in medicine inspired the attendance of the second largest group. Dr. Joseph M. Walsh, Erie, chairman of the medical society committee which arranged the conference, declared the unexpected enthusiasm of the high school students illustrates the usefulness of having other similar conferences.

Philadelphia

Dr. Bennett Becomes Dean at Jefferson.—Dr. William H. Perkins has resigned as dean of Jefferson Medical College because of his health. He will continue his position as professor of preventive medicine and head of the department. Dr. George A. Bennett, professor of anatomy, head of the department and director of the Daniel Baugh Institute of Anatomy, has been given additional duties as dean of the college. He has been a member of the faculty for 11 years. He was professor of anatomy and acting head of the department of anatomy at Georgetown University prior to joining the faculty of Jefferson.

Pittsburgh

Dr. Hamor to Receive Award.—William A. Hamor, LL.D., assistant director of Mellon Institute, has been named by the Pittsburgh Section of the American Chemical Society to receive its Pittsburgh Award for 1950. The award will be presented at a dinner in the University Club of Pittsburgh on December 21. Dr. Hamor has served on several governmental agencies and is a member of the Research Advisory Council of the Industrial Hygiene Foundation of America.

SOUTH DAKOTA

University News.—Dr. Ralph L. Ferguson, head, department of pathology, University of South Dakota School of Medical Sciences, Vermillion, resigned, effective November 1, to go into private hospital work in pathology in Joplin, Mo. Dr. Ferguson came to the university in 1945.

TEXAS

McReynolds Lecture in Ophthalmology.—The annual John O. McReynolds Lecture in Ophthalmology was given by Dr. Arlington C. Krause of the University of Chicago at the University of Texas Medical Branch, Galveston, November 6. Dr. Krause discussed some of his recent experimental studies on eye injury.

Rheumatism Association Meeting.—Dr. Richard H. Freyberg, associate professor of clinical medicine at Cornell University Medical School, New York, will be the honor guest at the Texas Rheumatism Association at the Shamrock Hotel, Houston, December 8. He will speak on "Practical Considerations in the Use of ACTH and Cortisone in Rheumatic Disease."

Committee on Skin Regeneration.—A special committee on skin metabolism and regeneration has been established at the University of Texas Medical Branch, Galveston, to correlate studies in these fields with particular reference to the management of burns and radiation injury. The chairman of the committee is Dr. Clarence S. Livingood, professor of dermatology and syphilology. The members of the committee include Dr. Truman G. Blocker Jr., professor of plastic and maxillofacial surgery; Charles M. Pomerat, Ph.D., director of the Tissue Culture Laboratory; Kenneth McConnell, Ph.D., director of the laboratory of medical physics, and Dr. Arild E. Hansen, professor of pediatrics.

VIRGINIA

Children's Service Center Moves.—The Children's Service Center, established in 1948 at the University of Virginia Department of Medicine, Charlottesville, as a child guidance clinic under the direction of Dr. Frank J. Curran, associate professor of neurology and psychiatry, has moved from the University of Virginia Hospital to larger quarters in the neighborhood. The center has a staff of 10.

WISCONSIN

Shortage of Animals for Research.—The regents of the University of Wisconsin November 11 took action to overcome the "unnecessary shortage" of dogs for teaching and research. They requested the state attorney general to take action to obtain compliance with the state law requiring that humane societies turn over stray dogs to the medical schools at the University of Wisconsin and Marquette University. Dr. Harold M. Coon of State of Wisconsin General Hospital said that material for third-year medical students taking surgery is not available to meet ordinary teaching needs. "The question is," he continued, "shall the laws of the state of Wisconsin be flouted by a small number of antimedical people and thereby hinder the teaching of medical students and the training of doctors for which there presently is a great need."

Memorial Lecture on Allergy.—Alpha Omega Alpha of the University of Wisconsin Medical School, Madison, will present a lecture in honor of the late Dr. William A. Mowry in the auditorium of Service Memorial Institutes at 8:00 p. m. December 7. Dr. Carl A. Dragstedt, professor of pharmacology at Northwestern University Medical School, Chicago, will speak on, "A Pharmacologist Looks at Allergy."

CANAL ZONE

Society News.—At the October meeting of the Medical Association of the Isthmian Canal Zone at Colon Hospital, Cristobal, the staff of Colon Hospital presented the scientific program. Dr. W. W. Jackson spoke on "Metal Fumes Fever." A paper prepared by Dr. Frank E. Riefkohl on "Infantile Scurvy on the Isthmus of Panama" was read, as was a paper by Dr. Pickney on "Differential Diagnosis of Splenomegaly."

GENERAL

Southern Surgical Association.—This association will hold its annual meeting at the Hollywood Beach Hotel, Hollywood, Fla., December 5-7, under the presidency of Dr. George V. Brindley, Temple, Texas. A series of 40 papers will be presented.

Southern Psychiatric Association.—This association held its annual meeting November 27-28 at the Williamsburg Inn, Williamsburg, Va., under the presidency of Dr. R. Finley Gayle Jr., Richmond, Va. Guest speakers included Dr. Trevo C. N. Gibbens, Institute of Psychiatry, London University, England, who spoke on "Notes on Psychiatrists' Attitudes," and Dr. Patrick H. Tooley, University of London, England, visiting professor of psychiatry, Bowman Gray School of Medicine, Winston-Salem, N. C.

Board of Ophthalmology Examinations.—Candidates for the certificate of the American Board of Ophthalmology are accepted for examination on the evidence of a written qualifying test held annually, in January, in various parts of the United States. Applications for the 1952 written test must be filed before July 1. Ninety-eight examinations have been held to date. Certificates issued total 3,143. The 1951 examinations will be held in San Francisco March 11-16, in New York May 31-June 5 and in Chicago October 8-13. Dr. John H. Dunnington, New York, is chairman of the board and Edwin B. Dunphy, Boston, is secretary-treasurer. The executive offices are at 56 Ivie Road, Cape Cottage, Maine.

Nutrition Foundation.—At its annual meeting November 16 at the Waldorf-Astoria Hotel in New York, the Nutrition Foundation, Inc., made grants-in-aid for research totaling $129,850. Contributions to the foundation, supported by 56 food manufacturers and related industries, total $350,000 annually. Contributions since 1942 when it was organized have amounted to over $4,000,000. The foundation is presently supporting basic research concerning the relation of food to anemia, bone formation, cancer, dental caries, diabetes, heart and vascular diseases such as hardening of the arteries, high blood pressure, glandular functions and infant health. Eight renewals of grants-in-aid and a like number of new applications were approved.

Dr. MacEachern Retires from College of Surgeons.—Officers, regents and the administrative staff of the American College of Surgeons held a dinner in Chicago November 19 in honor of Dr. Malcolm T. MacEachern, director emeritus of the college, on the occasion of his retirement. Dr. MacEachern began his service with the American College of Surgeons in August 1923 as director of hospital activities. From 1935 to 1949 he was associate director and chairman of the administrative board. In 1949 he was appointed director. In March 1950 he assumed his present title of director emeritus, and was succeeded as director by Dr. Paul R. Hawley. He remained in charge of the hospital activities of the college until the end of October. Dr. MacEachern will continue his duties as professor and director of Northwestern University's program in hospital administration, which he established in 1943. He is considering other activities. Among other honors, Dr. MacEachern received in 1939 the Award of Merit of the American Hospital Association; in 1948 the Gold Key of the Tri-State Hospital Assembly; in 1949 a Gold Key, diamond set, from the Association of Western Hospitals; in March 1950 the Winnipeg City Crest, and in October 1950 a citation from the New England Hospital Assembly and the Massachusetts Hospital Association for his 27 years of service to hospitals.

Fellowship Committee of Medical Association of Israel.—A group of American physicians, whose purpose is to strengthen the relation between Israelian and American medicine and to maintain the dignity and prestige of the physicians in Israel, has nearly 700 members and has been named the American Physicians Fellowship Committee of the Medical Association of Israel. The Israel Medical Association, which comprises 97 per cent of all physicians in Israel, is backing this organization. Members of this organization automatically become nonresident fellows of the Israel Medical Association and receive the medical quarterly of the Israel Medical Association, *Harefuah*, as well as an engraved membership diploma and card. The dues are $10 yearly. Applications will be received at 273 Main Street, Nashua, N. H. The officers of the committee are Dr. Morton J. Robbins, Nashua, N. H., president; Dr. Julius M. Rogoff, Pittsburgh, honorary president; Dr. Manuel M. Glazier, Boston, secretary, and Dr. Leon B. Schwartz, Bronx, N. Y., treasurer.

Mid-South Meeting of College of Physicians.—A regional meeting of the American College of Physicians including Louisiana, Texas, Tennessee and, by invitation, Alabama, Arkansas and Mississippi will be held at the Peabody Hotel, Memphis, Tenn., January 12-13 beginning at 1:30 p. m. Invited speakers include:

Lemuel W. Diggs, Memphis, Tenn., The New Nomenclature for Blood Cells.
Arthur C. Guyton, University, Miss., Studies on Controlled Acute Cardiac Failure.
Charles H. Burnett, Dallas, Texas, Adrenal Pituitary Relationships in Renal Function.

Other guests will be Dr. G. Morris Piersol, secretary general and a past president of the college; Dr. James E. Paullin, Atlanta, Ga., a past president; Mr. E. R. Loveland, executive secretary, Philadelphia, and Col. Jack Major, Paducah, Ky. At the informal banquet Friday at 7:00 p. m. Dr. William S. Middleton, Madison, Wis., president of the college and head of the department of medicine, University of Wisconsin, will speak.

Broadcast Programs on Democracy in Action.—The story of people in a remote mountain valley in Bat Cave, N. C., and of young Dr. George Bond will be the first of 13 radio programs in a new radio series over the NBC network on Saturday evenings, 7:00-7:30 p. m. Eastern Standard Time, beginning December 9. The episodes in this series tell the real life stories of how people in various communities in the United States, using democratic methods, acted together to solve their economic and social problems. It is produced jointly by the Twentieth Century Fund and the National Broadcasting Company. Other programs in the series deal with democracy in action in the fields of education, labor-management relations, housing, soil conservation and world trade. The program employs the recording of on-the-scene voices of the actual persons who lived the story.

Environmental Cancer Detection Unit.—A research program aimed to detect materials in everyday life which might be the cause of cancer is being conducted by a Cancer Prevention Committee with international membership and headquarters at the Institute of Industrial Medicine of the New York University-Bellevue Medical Center. Announcement of the program was made at a meeting of the Fifth International Cancer Congress in Paris in August. The purpose of the committee is to translate laboratory findings concerning environmental causes of cancer into practical application for everyday life in order to prevent persons from coming into contact with agents causing the disease, according to Dr. William E. Smith, chairman of the committee and a staff member of the Medical Center's Institute of Industrial Medicine. The committee includes representatives of university research programs, manufacturers, industrial physicians, engineers, industrial and governmental hygienists and statisticians. Data concerning certain types of cancer-producing materials have already been developed and have been passed on to the industries directly concerned. The large insurance companies were particularly cooperative in developing data concerning special cancer hazards.

Society Elections.—The following officers were elected at the recent meeting of the Association of State and Territorial Health Officers for the fiscal year 1950-1951: Dr. Roy L. Cheere, Denver, Colorado, president; Dr. Leroy E. Burney, Indianapolis, vice president, and Dr. John D. Porterfield III, Columbus, Ohio, secretary-treasurer.——The following doctors were elected for the forthcoming year at the November meeting of the American Society of Anesthesiologists, Inc.: Dr. Urban H. Eversole, Boston, president; Dr. C. Walter Metz, Denver, president-elect; Dr. J. Earl Remlinger Jr., Evanston, Ill., secretary, and Dr. Moses H. Krakow, Bronx, N. Y., treasurer.——At the annual meeting of the National Malaria Society in Savannah, Ga., November 6-10, the following officers were elected for 1951: Justin M. Andrews, Sc.D., Atlanta, Ga., president; Mr. W. H. W. Kimp, Bethesda, Md., president-elect; Dr. Eugene L. Bishop, Chattanooga, Tenn., vice president; Samuel W. Simmons, Ph.D., Savannah, Ga., secretary-treasurer, and George R. Coatney, Ph.D., Bethesda, Md., editor.——At the annual meeting in September of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons Dr. James K. Quigley, Rochester, N. Y., was named president. Dr. Leroy A. Calkins of Kansas City, Kan., is president-elect; Dr. Herbert E. Schmitz, Chicago, vice president; Dr. William F. Mengert, Dallas, Texas, secretary, and Dr. Ward F. Seeley of Detroit, treasurer.

U. S.-Canadian Allergy Map.—As part of an investigation of allergy, 38 U. S. and Canadian doctors have completed an allergy map of the two countries, locating the areas of heavy mold spore concentrations. Dr. Leonard H. Harris, Peoria, Ill., headed the committee of the American Academy of Allergy. According to the report by this committee, the investigators found two molds, Alternaria and Hormondendrum, in greatest abundance in the Great Plains of the United States, less in the Eastern states and least in the South and Southwest. These molds grow in great profusion on wheat, oats, hay and corn. Large concentrations of Alternaria, a common cause of some kinds of hay fever and asthma, were found in Chicago, Evanston and Peoria, Ill.; Madison, Wis.; Indianapolis; Des Moines, Iowa; Oklahoma City, and Ann Arbor, Mich. Cities with the lowest Alternaria counts are San Diego and Oakland, Calif.; Tucson, Ariz., and Miami Beach, Fla. Investigators in the United States and Canadian cities collected daily samples of air-borne molds by dish and glass slide technics. Members of the survey committee included Dr. Harris, Dr. Samuel F. Feinberg, Chicago, Dr. Theodore B. Bernstein, Chicago, Oren C. Durham, Ph.D., Waukegan, Ill., and Joseph C. Gilman, Ph.D., Iowa City.

National Nursing Improvement Program.—The W. K. Kellogg Foundation of Battle Creek, Mich., has granted $200,000 to finance a nationwide effort to improve nursing service in hospitals and health agencies during the next three years, under a program being developed by the National Committee for the Improvement of Nursing Services. The national committee, with headquarters in New York, will develop plans to help nursing gear its education and service to meet the changing health needs of the nation. Factors creating expanded nursing service demands are (1) the changing mode of life from rural to urban, (2) increased use of hospital facilities due to better economy and rapid growth of health insurance plans, (3) expansion of public health programs, (4) increase in employment of nurses in industry, (5) increase in nurses working in doctors' offices, (6) greater participation of nurses in research, (7) delegation to nurses of functions previously carried by doctors and (8) unstable quality and quantity of practical nurses and auxiliary workers.

The committee is sponsored by the six national nursing organizations. The Joint Commission for the Improvement of the Care of the Patient will serve as an interprofessional advisory committee. Committees have been organized in 28 states and two territories. The committee has already completed the first step in its program, a nationwide survey of the educational practices in schools of nursing.

Medical Television Wins Award.—The American Public Relations Association has presented Smith, Kline & French Laboratories, Philadelphia, its top award for the year's outstanding public relations project in the use of graphic arts. This Silver Anvil Award was given for the firm's project of transmitting surgical and medical procedures to medical meetings throughout the country, using color television. Color television was tested in May 1949 at the University of Pennsylvania, Philadelphia. This equipment made its debut at the annual session of the American Medical Association in Atlantic City last June. In the following year of demonstrations the firm took the equipment 14,000 miles to 11 medical conventions, colorcasting 300 surgical operations and medical clinics to more than 100,000 physicians. Included was the first intercity medical colorcast last December during the A. M. A.'s clinical session in Washington, D. C., when the program was colorcast from the Johns Hopkins Hospital in Baltimore. Other cities visited were Denver, Chicago, New York, Atlanta, St. Louis, Boston, Fort Worth and San Francisco, with programs presented to the American College of Surgeons, American Cancer Society, state medical societies of Colorado, Missouri and Texas, the Chicago Medical Society, the Atlanta Graduate Medical Assembly and this year's A. M. A. annual session. In the second year of these programs the firm has presented color television to the District of Columbia medical society, Pennsylvania medical society, American College of Surgeons and the International College of Surgeons. On the agenda are 13 other meetings.

CANADA

Hospital News.—St. Joseph's Hospital, in Montreal, which has been completed at a cost of $5,000,000, will accommodate more than 600 patients. There are a number of special research laboratories and six operating rooms. Two years were required to build the six floor fire-proof hospital.

Mickle Fellowship Awarded.—The 1950 Charles Mickle Fellowship, which is awarded annually by the University of Toronto to "the member of the medical profession who has done most during the preceding ten years to advance sound knowledge of a practical kind in medical art or science," has been awarded to Dr. Selman A. Waksman, department of microbiology, Rutgers University, New Brunswick, N. J. The fellowship is accompanied with a cash award of $800, which Dr. Waksman said he will use to further his research in microbiology.

New Medical School Opens in Vancouver.—The Faculty of Medicine, University of British Columbia, commenced its first year of instruction on September 7. The preclinical departments are housed in temporary quarters and clinical teaching will be given at the Vancouver General Hospital and other local hospitals. Instruction during the first year is being offered in anatomy, histology, biochemistry, physiology, history of medical progress, human behavior. introduction to medicine and introduction to public health. Of some 300 applicants, 60 were admitted. Though the minimum academic requirment is three years of college credits after junior matriculation, 52 students have their bachelor's degrees. All but three are residents of the Province of British Columbia. Dr. Myron M. Weaver, dean of the faculty, was formerly assistant dean of the medical sciences, University of Minnesota.

FOREIGN

Mecca Pilgrimage Free of Epidemics.—As a result of international medical and sanitary measures promoted by the World Health Organization (THE JOURNAL, June 17, page 666), the Mecca Pilgrimage of 1950 (Year of the Hegira 1359) was declared "free from infection" and thus cleared of the traditional danger of outbreaks of disease among pilgrims. The Public Health Department of Saudi Arabia has cabled WHO that out of the 500,000 travelers to Mecca, fewer than 120 deaths were recorded. These were caused by sunstroke and general debility of old age; no case of epidemic disease was ascertained.

Maternal and Child Health Center in India.—The World Health Organization and the Indian health services have cooperated in setting up a field center for maternal and child health in a rural area of Delhi Province in India. This project is being enlarged to form an over-all teaching and training project for medical students, nurses and social workers, with courses in Delhi hospitals and colleges also. Additional centers in Afghanistan and Burma and other parts of Southeast Asia will help in the improvement of the health of mothers and children and particularly in lowering the infant death rate.

Anti-Rabies Mass Vaccination of Dogs on Mexican Border.—The entire dog population of Ciudad Juarez, Mexico, was recently vaccinated as one of a series of measures to stamp out rabies along the Mexico border. The vaccination of the city's 3,500 dogs was a pilot project conducted by the Mexican health authorities, with the cooperation of the Pan American Sanitary Bureau, Regional Office of the World Health Organization, and will serve as a model for mass vaccination operations in other towns along the border. Aurelio Malaga-Alba, D.V.M., Peru, is coordinator of the rabies eradication program. The National Institute of Hygiene of Mexico City furnished the vaccine, and the equipment and instruments were supplied by the Pan American Sanitary Bureau. Public response was prompt. A single veterinarian was able to vaccinate 400 dogs a day, and the entire operation, including humane disposal of all unclaimed dogs that were rounded up in the streets, was completed within eight days. It was reported that last year 179 persons in that city alone received anti-rabies treatment and that from January to September 1950 more than 300 persons had been bitten.

The Pan American Sanitary Bureau was designated in April of 1949 as the coordinating agency for an intensive program of rabies eradication along the U. S.-Mexico border. To standardize the diagnostic procedure throughout Mexico, four laboratory courses were given in Mexico City, which were attended by one hundred physicians, laboratory technicians, veterinarians and bacteriologists. A small group of Mexican scientists came to the U. S. Public Health Laboratories in Atlanta, Ga., to make special studies in rabies diagnosis.

CORRECTION

Costs of Hospitalized Illness.—In the article "Costs of Hospitalized Acute Illness," by Theodore Wiprud and Isidore Altman (Nov. 4, 1950), line 7, second column, page 838, should read "of the hospital bill that Group Hospitalization subscribers."

Fourth General Assembly of World Medical Association.—In the account of the Social Events listed on page 1011 of THE JOURNAL of November 18, the name of E. R. Squibb & Sons was inadvertently omitted from the list of those sponsoring luncheons for the World Medical Association.

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

EXAMINING BOARDS IN SPECIALTIES

AMERICAN BOARD OF ANESTHESIOLOGY: *Written.* July 20. Given simultaneously in several cities in the United States. Final date for filing application is Jan. 20. *Oral.* Coronado, Calif., April 4-7 and Memphis, Oct. 14-17. Sec., Dr. Curtiss B. Hickcox, 80 Seymour St., Hartford 15, Conn.

AMERICAN BOARD OF INTERNAL MEDICINE: *Oral, including subspecialties,* Dec. 7-9. Executive Secretary-Treasurer, Dr. William A. Werrill, 1 West Main St., Madison 3, Wis.

AMERICAN BOARD OF NEUROLOGICAL SURGERY: *Oral.* Chicago, May 1951. Sec., Dr. W. J. German, 789 Howard Ave., New Haven 4, Conn.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: Part I, Written Examination and Review of Case Histories. Various locations. Feb. 2, 1951. Final date for filing applications was Nov. 5. Sec., Dr. Paul Titus, 1015 Highland Building, Pittsburgh 6, Pa.

AMERICAN BOARD OF OPHTHALMOLOGY: *Written.* Various Centers, Jan. 5-6, 1951. *Oral.* San Francisco, March 11-15; New York, May 31-June 5; Chicago, October 8-13. Sec., Dr. Edwin B. Dunphy, 56 Ivie Road, Cape Cottage, Maine.

AMERICAN BOARD OF ORTHOPAEDIC SURGERY: *Part II.* Chicago, Jan. 25-26. Final date for filing applications was Aug. 15, 1950. Final date for receipt of Part I applications for 1951 is Dec. 30, 1950. Sec., Dr. Harold A. Sofield, 122 So. Michigan Ave., Chicago 3.

AMERICAN BOARD OF OTOLARYNGOLOGY: *Written.* New York, Jan. 8-11, 1951. *Oral.* Richmond, Va., May 1-5. Sec., Dr. Dean M. Lierle, University Hospital, Iowa City.

AMERICAN BOARD OF PEDIATRICS: *Written.* Jan. 19. Under local monitors. Only written examination to be given during 1951. *Oral.* New Orleans, March 2-4. Ex. Sec., Dr. John McK. Mitchell, 6 Cushman Road, Rosemont, Pa.

AMERICAN BOARD OF PROCTOLOGY: *Part I in Anorectal Surgery and Proctology.* Dallas, Minneapolis, Philadelphia and San Francisco, May 12. Sec.-Gen., Dr. Louis A. Buie, 102-110 Second Ave., S.W., Rochester, Minn.

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: New York, Dec. 18-19. Final date for filing applications was Sept. 1. Sec., Dr. Francis J. Braceland, 102-110 Second Ave., S.W., Rochester, Minn.

AMERICAN BOARD OF RADIOLOGY: *Oral.* Atlantic City, June 5-9. Sec., Dr. B. R. Kirklin, 102-110 Second Ave., S.W., Rochester, Minn.

AMERICAN BOARD OF SURGERY: *Written.* Various centers, March 1951. Final date for filing applications was Dec. 1, 1950. *Written.* Various centers, Oct. 1951. Final date for filing applications is July 1. Sec., Dr. J. Stewart Rodman, 225 South 15th Street, Philadelphia.

AMERICAN BOARD OF UROLOGY: Chicago, Feb. 10-14, 1951. Final date for filing applications was Sept. 1, 1950. Chicago, Feb. 9-13, 1952. Final date for filing applications is Sept. 1. Sec., Dr. Harry Culver, 314 Corn Exchange Bldg., Minneapolis 15.

Coming Medical Meetings

American Medical Association, Clinical Session, Cleveland, Dec. 5-8. Dr. George F. Lull, 535 N. Dearborn St., Chicago 10, Secretary.

American Academy of Dermatology and Syphilology, Palmer House, Chicago, Dec. 2-7. Dr. John E. Rauschkolb, P. O. Box 6565, Cleveland, Secretary.

American Association of Medical Clinics, Hotel Cleveland, Cleveland, Dec. 4. Dr. Arthur H. Griep, Welborn Clinic, Evansville, Ind., Secretary.

American Psychoanalytic Association, Waldorf-Astoria Hotel, New York, Dec. 7-10. Dr. LeRoy M. A. Maeder, 1910 Rittenhouse Square, Philadelphia 3, Secretary.

American Society for Surgery of the Hand, Palmer House, Chicago, Jan. 26. Dr. Joseph H. Boyes, 1401 S. Hope St., Los Angeles 15, Secretary.

International Post-Graduate Medical Assembly of Southwest Texas, Municipal Auditorium, San Antonio, Jan. 23-25. Dr. John H. Hinchey, P. O. Box 2445, San Antonio 6, Secretary.

Puerto Rico, Medical Association of, Santurce, Dec. 13-17. Dr. Victor J. Montilla, P. O. Box 3866, Santurce 29, Secretary.

Radiological Society of North America, Palmer House, Chicago, Dec. 10-15. Dr. Donald S. Childs, 713 E. Genesee St., Syracuse 2, N. Y., Secretary.

Southern Surgical Association, Hollywood Beach Hotel, Hollywood, Fla., Dec. 5-7. Dr. John C. Burch, 2112 West End Ave., Nashville 5, Tenn., Secretary.

DEATHS

Halliday, Charles H., Baltimore; born in Metropolis, Ill., Sept. 26, 1880; College of Physicians and Surgeons, Baltimore, 1904; medical officer, United States Coast and Geodetic Survey, 1905-1906, when he joined the medical department of the U. S. Army in the Philippines and resigned in 1915 to accept position as medical superintendent of Zamboanga Hospital in the Philippines; a year later joined the Royal Army Medical Corps and served in France until November 1917; rejoined the American Army as captain and was assigned to Military Hospital in Paris from November 1917 to April 1918; medical inspector, Chateau Thierry Sector, April 1918 to October 1918; promoted to major in 1918; at the request of the International Red Cross Society he became epidemiologist for the Ministry of Health of Poland and then served with the American-Polish Typhus Commission from August 1919 to December 1919; later was medical inspector for the American Red Cross Commission to Poland, then deputy commissioner to Poland; senior epidemiologist for the Minnesota State Department of Health in 1921; surgeon in the U. S. Public Health Service Reserve, 1921-1922, when he was appointed epidemiologist for the California State Department of Health; in 1929 accepted position as epidemiologist for the Maryland State Department of Health and was later made chief, bureau of communicable diseases, serving in this capacity until his retirement in January 1950; colonel in the Maryland State Guard during World War II; received decorations from the United States, Britain, France, Poland and Russia; died in the University Hospital September 30, aged 70, following a gallbladder operation.

Allen, Elijah Henry, Washington, D. C.; Howard University College of Medicine, Washington, 1894; for many years affiliated with Freedmen's Hospital, where he died September 28, aged 89.

Baker, Archie Maurice ✦ Lindenhurst, N. Y.; Syracuse University College of Medicine, 1922; member of the American Association of Industrial Physicians and Surgeons; past president of the Suffolk County Medical Society; served as village health officer; member of the board of education; director of the Lindenhurst Bank; affiliated with Southside Hopital, Bay Shore; consultant at Kings Park (N. Y.) State Hospital; died September 24, aged 54, of acute myocardial infarction.

Baker, Frank Macklin ✦ Indianapolis; Northwestern University Medical School, Chicago, 1936; served during World War II; affiliated with the Veterans Administration Hospital at Fort Harrison, where he died September 24, aged 40, of myocardial infarction.

Balliet, Tilghman M., Philadelphia; University of Pennsylvania Department of Medicine, Philadelphia, 1887; professor of therapeutics, emeritus, Dartmouth Medical School, Hanover, N. H.; died September 27, aged 91.

Belknap, Virgil Clarence, Nampa, Idaho; Jefferson Medical College of Philadelphia, 1894; member of the American Medical Association; affiliated with the State School and Colony; on the staff of Mercy and Samaritan hospitals; died September 20, aged 78, of coronary thrombosis.

Benson, Gideon H., ✦ Richland Center, Wis.; Rush Medical College, Chicago, 1904; served during World War I; president of the board of education and coroner; director of the Farmers and Merchants Bank; died in Presbyterian Hospital, Chicago, September 26, aged 83, of bronchopneumonia.

Berry, Jerome Francis ✦ Kalamazoo, Mich.; University of Vermont College of Medicine, Burlington, 1913; in 1937 was appointed to what was then the newly created Michigan State Hospital Commission; served during World War I; for many years affiliated with Kalamazoo State Hospital; died in the New England Deaconess Hospital, Boston, September 23, aged 64, of gastrointestinal hemorrhage.

Carolus, Walter I., Sterling, Ill.; the Hahnemann Medical College and Hospital, Chicago, 1902; member of the American Medical Association; served as city health officer; died in Community General Hospital September 18, aged 77, of carcinoma.

Diedling, Rudolph Francis, West Palm Beach, Fla.; Albany (N. Y.) Medical College, 1896; served during World War I; died September 14, aged 75, of heart disease.

Ewing, John Sharp ✦ Newellton, La.; Medical Department of Tulane University of Louisiana, New Orleans, 1904; served during World War I; died in Vicksburg, Miss., September 18, aged 70, of carcinoma of colon,

✦ Indicates Fellow of the American Medical Association.

Heim, Lyman David ✦ Schuylkill Haven, Pa.; Jefferson Medical College of Philadelphia, 1903; for many years president of the board of health of Schuylkill Haven and member of the board of education; past president of Schuylkill County Medical Society; one of the founders and served as chief of staff of the A. C. Milliken Hospital in Pottsville and the Good Samaritan Hospital; physician for the county almshouse; died September 19, aged 73, of heart disease.

Janson, Christian William, Brooklyn; Cornell University Medical College, New York, 1902; fellow of the American College of Physicians; member of the National Gastroenterological Association; served with Wyckoff Heights Hospital and Lenox Hill Hospital; died September 15, aged 71, of coronary thrombosis.

Keppel, Frederick Dudley, Syracuse, N. Y.; Southern Homeopathic Medical College, Baltimore, 1897; served during World War I; surgeon of the Army and Navy Union of New York State; died September 13, aged 77, of coronary occlusion with infarction.

Lynch, Thomas Augustine, Lowville, N. Y.; Fordham University School of Medicine, New York, 1919; member of the American Medical Association; served during World War I; served as physician for Lowville Free Academy, the Lewis County Jail, and Lewis County Selective Service Board and health officer of the village of Lowville; affiliated with Lewis County General Hospital, where he died September 17, aged 54, of injuries received in a fall.

Maben, Buel Wilber, Kingston, N. Y.; Long Island College Hospital, Brooklyn, 1892; died in the Masonic Home Hospital, Utica, September 15, aged 80, of coronary sclerosis.

McCall, Samuel W., Collierville, Tenn.; Memphis (Tenn.) Hospital Medical College, 1893; died September 18, aged 82, of cerebral hemorrhage.

Meinzer, Martin Stoetzel ✦ Perth Amboy, N. J.; Columbia University College of Physicians and Surgeons, New York, 1905; fellow of the American College of Surgeons; formerly school physician, city physician and on the board of health; served on the staff of Perth Amboy General Hospital, where he died September 14, aged 72, of acute myocardial infarction.

Parker, Paul Godwin ✦ Erwin, N. C.; Medical College of Virginia, Richmond, 1916; member of the board of medical examiners of the State of North Carolina; past president of the Harnett County Medical Society; served during World War I; president of the county board of health; affiliated with Good Hope Hospital; died September 19, aged 57, of coronary occlusion.

Pearson, Charles Edward, Staten Island, N. Y.; Columbia University College of Physicians and Surgeons, New York, 1900; member of the American Medical Association; fellow of the American College of Surgeons; past president of the Richmond County Medical Society; at one time trustee of the Staten Island Savings Bank; formerly served on the staff of Seaview Hospital; for many years affiliated in various capacities with Staten Island Hospital, where he died September 16, aged 72.

Sauthoff, August ✦ Madison, Wis.; Rush Medical College, Chicago, 1905; member of the American Psychiatric Association; specialist certified by the American Board of Psychiatry and Neurology; served on the staff of the Mendota State Hospital; died September 19, aged 74, of subdural hematoma and cerebral contusion as the result of an automobile accident.

Scouler, Ambrose Alphonse, New York; Columbia University College of Physicians and Surgeons, New York, 1896; for many years in charge of the tuberculosis clinic of the health department in Brooklyn; affiliated with St. Vincent's Hospital; died in Fair Oaks Sanatorium in Summit, N. J., September 18, aged 78, of arteriosclerosis and cardiac asthma.

Seitz, George, Holyrood, Kan.; University Medical College of Kansas City, Mo., 1900; member of the American Medical Association; served as health officer of Saline County; died in St. John's Hospital, Salina, September 14, aged 71, of cerebral hemorrhage.

Smith, Frank Campbell, Bessemer, Ala.; Birmingham Medical College, 1903; member of the American Medical Association; affiliated with the Employees Hospital of Tennessee Coal, Iron and Railroad Company in Fairfield, where he died in the Lloyd Noland Hospital September 14, aged 71, of myocardial infarction and coronary disease.

FOREIGN LETTERS

LONDON

(From a Regular Correspondent)

Sept. 22, 1950.

International Society of Haemotology

The Third Congress of the International Society of Haemotology was held in Cambridge, under the presidency of Sir Lionel Whitby, August 21-26.

Anemia.—The first meeting on this subject was devoted to therapy, and Dr. E. Lester Smith (England) opened with a paper describing the isolation and properties of vitamin B_{12}. This was followed by a discussion by Dr. E. H. Morgan and his co-workers (United States) and Dr. Grace Goldsmith (United States) on the effect of the oral administration of vitamin B_{12} in pernicious anemia, in the absence of known sources of the intrinsic factor. The latter described the effects of vitamin B_{12}, given orally and parenterally. Other contributions concerned the therapeutic effect of vitamin B_{12} obtained from a variety of new sources, the use of the vitamin in the treatment of tropical macrocytic anemia and the effect of cobalt therapy in various anemias. Dr. O. P. Jones (United States) described the action of antianemic substances on embryonic prehepatic erythropoiesis. Dr. G. Larsen (Norway) described the pathogenesis of the macrocyte and pointed out that even in adequately treated pernicious anemia macrocytes still showed in the peripheral blood. The thickness of the cells was about half of normal and their life span 40 to 60 days. Further papers and discussions centered on whether vitamin B_{12} alone was an adequate hemotherapeutic agent in pernicious anemia.

On August 25 a session was devoted to nutritional factors in anemia, and Dr. C. R. Das Gupta (India) discussed the etiology of nutritional macrocytic anemia. Drs. V. Ramalingaswami and H. M. Sinclair (England) spoke on the etiology and pathogenesis of polycythemia in pyridoxine deficiency in the rat. Dr. J. F. Rinehart (United States) gave an account of experimental pyridoxine deficiency in the rhesus monkey. The action of folic acid, liver extracts, vitamin B_{12} and other substances with antianemic properties as described by Dr. A. Aschkenasy (France), L. Tentori and G. Vivaldi (Italy), O. Carere-Comes (Italy) and G. Sotgiu and C. Cacci (Italy). Dr. A. R. Axelrod and L. Berman (United States) presented their findings in the bone marrow in hypothyroidism and hyperthyroidism. The incidence of lymphocytes in bone marrow in hyperthyroidism may reach levels comparable to chronic lymphatic leukemia with no peripheral lymphocytosis.

Leukemia.—Leukemia due to benzine, one of the rare human leukemias of which the cause is known, was the subject of papers by Dr. J. Bernard (France) and Dr. L. Braier (Argentina). The cytology of acute leukemias, unusual types of leukemias in children, the possibility of a virus in the etiology with some supporting experimental work and the significance of leukemia plasma in cytogeneses were also discussed.

Problems of Coagulation.—The session here was opened by Dr. F. J. Leibetseder (Austria) who discussed the effect of epinephrine and dihydroergotamine on the first stage of coagulation. Drs. R. Breda and R. Bernardi (Italy) described a condition present in two brothers belonging to a family affected with hereditary hemorrhagic telangiectasia, who showed a prolongation of prothrombin time. Experiments conducted with plasma from these cases suggested the possibility of an antiprothrombin conversion factor. Other experts described the coumarin treatment of experimental thrombosis. The correlation between deficiencies or increases of blood-clotting factors and dysproteinemias was described by Dr. P. de Nicola (Italy). The clinical and hematological problem of thrombophilia was discussed.

Immunohematology.—In the first meeting devoted to immunology, papers were read by Dr. L. Berman and co-workers (United States) on the so-called lupus erythematosus inclusion phenomenon. The present position of blood groups was reviewed briefly by Dr. J. Van Loghem (Holland). An account was also given by other experts on the Duffy blood group system. Dr. A. D. Mourant (England) described the distribution of blood groups in relation to transfusion organization, and Dr. G. Fulton Roberts (England) discussed the prozone inhibition that some antiglobulin serums show when tested against weakly sensitized cells.

Dr. A. S. Wiener (United States) described with illustrative cases the medicolegal application of the rhesus blood types. Dr. P. Levine (United States) summarized the position of the Kell-cellano system of blood factors, and Drs. R. R. Race and R. Sanger (England) described a blood lacking in any detectable representative of the C and E series of allelomorphic antigens. This case represents a probable deletion in a human Rh chromosome and supports the separability of the C, E and D genes. A notable paper was presented by Dr. S. Filitt-Wurmser and co-workers (France) on the differentiation of "A" blood groups by their agglutinins. Dr. P. Vogel (United States) helped to conclude the session by a communication on the technical consideration and results in replacement transfusion in infants.

The Clerical Work of a Doctor's Surgery

A recent report by Dr. E. D. Willis and Anne G. Shaw in the *British Medical Journal* on the clerical work in a physician's surgery aroused sufficient interest to appear summarized in the *London Times*. With the increase of clerical work, e. g., compulsory record keeping and certificate writing involved in the change-over in this particular practice, from one that was mainly "private" to one mainly "national health," the services of a motion study investigator were enlisted to eliminate redundancy and improve the efficiency of the record keeping of the practice.

A definition of motion study is given in the article as the scientific investigation of the movements involved in the performance of any piece of work and the development of a plan which eliminates unnecessary movement and conserves energy, time and material. This method of improving efficiency is, of course, well known in industry. The first essential in such an investigation is a study of existing methods, then to record them and analyze them and then to make use of one of the available technics to institute improvements. In this case a simple technic sufficed, that is, the process chart. This chart makes available a series of facts in such a way that they can be both visualized as a whole and examined in detail. The process chart enables each detail of procedure to be questioned. Is its place in the sequence right? Can it be combined with any other detail? Can it be simplified? On this a further chart is made and a new simplified and streamlined procedure is evolved, and, it seems to have been a definite improvement in the clerical work both as regards efficiency and the volume handled.

In examining the clerical procedures in the practice, the investigators found there were three sets of records: a log book, into which messages received by telephone were entered immediately; a visit book, in which records were kept, month by month, of patients visited in the course of an illness, and a record of the necessity of visiting a chronically ill patient, that is, a routine follow-up visit. Third, a series of record cards for private and national health patients on which clinical details were noted and, in the case of the former, the fee was recorded.

In the new methods evolved, the investigator was able to eliminate the second record, the visit book, entirely. He did this by making further use of the permanent record cards and by making space available for a wall rack into which each morning the secretary placed cards for the patients being treated, the chronically ill patients due for a visit and any new patients' cards which may have come in from the previous day (telephone requests or visits). The cards were arranged in columns for each day of the week. Space was made available at the end of the rack for two columns for cards which were required during the following two weeks.

A small sliding table was placed at the bottom of the wall rack containing prescription forms, certificate forms and the National Health Formulary, so that when the doctor returned from a visit he could write out notes, prescriptions and certificates on the spot. He could also enter details on cards where needed and regroup the cards where necessary. The laborious copying of the names of patients who were visited in one month into the page for the new month was thus eliminated. Instead of having to go both to the log book and to the visitors book when compiling the list of visits for the day, the doctor merely had to glance at the cards in the column for a particular day and make a list in his notebook of the patients who required a visit. On the return from the visit notes from the notebook were entered on the card. As a result of this the doctor is able to perform necessary clerical work more efficiently and the greater volume due to the National Health Service and have more time for the clinical examination of patients, and perhaps more time for well earned leisure.

Colchicine in the Chemotherapy of Cancer

No doubt stimulated by the recent reports on the so-called secret cure for cancer, and by its leading article on the subject, the *British Medical Journal* in another leading article published an interesting review of the therapeutic effect of colchicine in cancer. In the first article it was pointed out that part of the secret cure was suspected of being oral administration of colchicine. The drug, they say, is a radiomimetic and has been much used in research for a chemotherapeutic agent against cancer. It is an alkaloid derived from the autumn crocus and is probably the most powerful "radiomimetic" drug known; the cellular changes induced are similar to those induced by roentgen rays. Even at dilutions of 1 to 100,000,000 it can bring about the typical mitotic arrest at the metaphase stage. Microscopically, areas of a tissue treated with colchicine will sometimes show more cells in arrested division than in the resting state. Ludford (*J. Nat. Cancer Inst.* **6**: 89, 1945) examined the mode of action of colchicine on tissues grown in vitro and observed that the drug does not differentiate between embryonic and neoplastic tissues, which are equally sensitive to its mitosis-arresting activity. Although other drugs produce a similar effect, Ludford points out that colchicine is unique, in that it does not arrest the initial phase of division but brings the process to a standstill at the metaphase in a remarkably wide range of concentrations. There is little evidence that it stimulates mitosis as well as block it at the metaphase. Further evidence shows that in high dilution it slows down the rate at which cells enter the mitotic cycle. Macroscopically, the most obvious effect of the drug on a tumor is hemorrhage of the kind also caused by polysaccharide fractions of bacterial filtrates, for instance, from Serratia marcescens. Although there is a close parallel between the nucleotoxic action of colchicine and of roentgen rays, e. g., the acquired tolerance of tumor cells to the drug and the acquired radio resistance of tumors which were previously radiosensitive, the article points out there are certain differences in the toxic effects on the nuclear chromatin. Colchicine is much more specific in its action on the nuclear structures. Probably the most outstanding difficulties in the colchicine treatment of tumors is the lack of cell type specificity. Tests with the aim of supplementing the action of colchicine with radiotherapy have been, on the whole, without success. Several workers have investigated the action of colchicine in the treatment of cancer in man, but it was found that the drug caused very unpleasant symptoms, and sometimes death from colchicine poisoning. A woman with adenomedullary carcinoma of the breast was treated with colchicine combined with roentgen rays. The lesion shrank to a third of its original size and then began to grow again rapidly, with fatal results. In a patient with an anaplastic carcinoma of the neck a similar reaction was noted; the central portion of the tumor became necrotic, but the peripheral layers grew with increasing speed. The article sums up by citing Seed, Slaughter and Limarzi to the effect that, although the rapidly growing cancer cells are much more susceptible to the poison, the concomitant general toxic effect is much too great to permit any curative effect.

Gastrectomy

In a leading article, the *Lancet* produces some interesting figures with regard to gastrectomies. It states that it would probably be fair to say that 95 per cent of patients survive the operation, 75 per cent are relieved of their old symptoms without acquiring new ones and 20 per cent have further symptoms due either to recurrent ulceration (3 to 4 per cent) or to disturbance of alimentary function. This disturbance, they state, is occasionally severe. They quote one doctor-contributor, "If he had known about the attacks of extreme lassitude which were to follow his gastrectomy he would rather have kept his ulcer and borne its pain."

ITALY

(From a Regular Correspondent)

FLORENCE, Sept. 17, 1950.

Protein Synthesis

In addition to the lectures presented at the Superior Institute of Public Health in Rome which were previously reported, Prof. Artturi Virtanen, Nobel Laureate and director of the Institute of Biochemistry in Helsinki, spoke on nitrogen assimilation and protein synthesis. While most micro-organisms and higher plants use as a source of nitrogen either nitrates or ammonia, some micro-organisms are able to use molecular nitrogen. According to the speaker, the metabolic pathways which start from these sources of nitrogen must converge at an early stage, because there is no appreciable difference in the proteins or in the enzyme systems of the cells, irrespective of the source of the nitrogen. The role of ammonia in the synthesis of the amino acids has been amply confirmed, but hydroxylamine originating through reduction of nitrates and the aerobic fixation of molecular nitrogen may also take part in the synthesis of the amino acids.

The speaker discussed also the formation of the peptide linkage and the synthesis of protein. Whether amino acid synthesis precedes the formation of the peptide linkage or whether the amination occurs after the linkage is formed is not known. The concept of Bergman on the enzymatic formation of peptides through a dehydration process is not universally accepted and, from the point of view of energy requirement, does not seem likely. On the other hand, the participation of a phosphoric acid ester in the synthesis seems well founded. The synthesis of polypeptides, considered as counteraction to enzymatic hydrolysis, has been studied recently by the speaker and his co-workers. The peptides, having a small molecule, combine to form under the action of pepsin a polypeptide, with a larger molecule, the synthesis of which proceeds gradually. At the beginning, polypeptides of an average of 8 to 12 peptides of small molecule are formed. With longer periods of reaction, the size of the polypeptides increases continuously; the average molecular weight of the largest synthesized polypeptides is about 12,000. The

roentgen diffraction pattern of such polypeptides is similar to native protein, but the rings are clearer and more defined. The potential energy for the synthesis of polypeptides by the action of proteases seems to be greater than the energy required for the synthesis of dipeptides and tripeptides. The synthesis of polypeptides (plasteins) has been obtained from zein hydrolysate by the action of pepsin. The great specificity of proteases and their behavior in the in vitro synthesis of polypeptide chains prove synthesis of polypeptides in vivo under the influence of proteases.

COLOMBIA

(From a Regular Correspondent)

BOGOTÁ, Sept. 15, 1950.

Basic Principles for a Public Health Program

The economic mission organized by the International Bank for Reconstruction and Development in Washington, under the auspices of the Colombian government, formulated a program to raise the standard of living in Colombia. The mission presented its report to the authorities in Washington and in Bogotá on August 13. This plan achieves one of the main purposes of the institution, namely, to give advice and technical aid to countries. The mission, presided over by Mr. Lauchlin Currie, worked in Colombia for one year. The results accomplished were recently reported in a 900 page book, "Principles of a Program for the Improvement of Public Health and Standards of Living in Colombia," published by the Press of the Bank of Colombia. The program planned will be developed in the course of five years. It covers the fields of industry, agriculture, public roads, oil wells, electric power, public works, taxes, international exchange and public hygiene. The program is now under careful study by the heads of the International Bank for Reconstruction and Development and by the government of Colombia. The chapter concerning hygiene and public health contains the following statement: "Health is the most important factor in raising the standard of living of the people." The life expectancy at birth in Colombia is less than 40 years, whereas in countries with good sanitary conditions it is 70 years. This reduced life span together with early deterioration of working capacity of laborers, because of poor health, causes a higher proportion of dependents for each worker, more than 4 to 1. The incidence of diseases, including endemic tropical diseases as well as those common to temperate zones, is high. Nutritional disorders are common. The sanitary precautions are minimal. Purification of milk and the sewer and waste disposal systems are inadequate. These problems are receiving attention. The campaigns against malaria and other common diseases in the country have begun. Several hospitals and medical centers have been built, and an extensive program for the construction of aqueducts and sewers has been started. However, there is still a great deal to be done.

The most important aspect of a public health program lies in the prevention of disease. The following needs call for prompt attention: (1) organization of the public health service with definition of its functions, (2) protection of the health of the people by the supply and maintenance of sanitary facilities, (3) recruitment and training of professional personnel for public health service and (4) enlargement and improvement of hospitals and other medical centers.

The mission recommends that the relations between the Ministry of Hygiene and the dependent agencies be clarified. The national government should continue to give financial support to the local dependent agencies. The Ministry of Hygiene should supervise the distribution and use of such funds and should otherwise restrict itself to functions such as preparing and issuing laws, fixing standards of health, giving advice and collecting data from research work and statistical studies. It should be responsible for the administration of certain health and hygiene institutions of the entire country or of the large regions of the country. The departments under the ministry should be responsible for services such as the organization and function of clinics for the diagnosis of disease and the distribution of drugs and biological products; the municipal dependencies would carry on most of the routine treatments and the activities for prevention of diseases in the municipalities. The main requirements are housing, adequate public services, aqueducts, sewers, hygienic toilets and septic tanks. Measures for controlling sanitation and the quality of foods and milk are important.

It is calculated that 2,750 physicians, 870 dentists and dental assistants and 6,250 nurses will be needed in 1955 to carry out the program. This increase over the present figures for the aforementioned categories is considerable. For this reason, public employment of physicians and persons in the medical branches, mainly on a part time basis, will be necessary. Several measures, such as the creation of the National School of Hygiene, have been taken to increase the reserves of personnel. The mission recommends a substantial increase in salaries, better working conditions, security of jobs and opportunities for progress by means of a genuine merit system. Emphasis is given in the report to the campaign against infectious and parasitic diseases. The progress obtained in recent years in the treatment of such diseases as malaria, smallpox, diphtheria, whooping cough, syphilis and gonorrhea has been so satisfactory that these campaigns, if properly organized, would have excellent results. It is recommended that the present program against leprosy, which now uses up almost one fourth of the national budget for hygiene, should be modified. The actual expenses are excessive in proportion to the importance of leprosy in Colombia.

The Ministry of Hygiene calculated hospital needs on the basis of 5.3 beds per 1,000 persons (the present proportion is 2 per 1,000). This expansion seems to be too great to be accomplished in five years. It is therefore suggested that hospital beds be increased in a proportion of 3 beds per 1,000 persons for the whole country. The minimum proportion will be 2 per 1,000. This program requires more than 17,000 new beds in the general hospitals. The provision of 4,500 additional beds for tuberculosis is recommended. The Ministry plans to build some 146 health centers in the large cities and 648 subordinate centers in the small towns.

The most important social welfare centers are the Social Welfare and Public Aid stations. These centers are supported and supervised by the national government, and their activities are limited almost exclusively to the support and administration of hospitals and other institutions. A much greater number of workers is needed. The annual cost of the program will be about 24 per cent of the total budget—8 per cent for health and maternity, 4 per cent for a pension plan, 4 per cent for invalidism, 4 per cent for old age benefits and 4 per cent for workers' insurance. The employer, the employee and the government share equal portions in the premium. The problem of the relations between the social security system and the other programs of hygiene and social welfare is complicated. The mission did not intend to reach definite conclusions. However, it points out that the new program of social insurance should be developed without interfence with the progress of previously organized social services.

Personals

Dr. Braulio Henao Mejia, former dean of the school of medicine of the University of Antioquia and professor of the gynecology clinic, was appointed governor of the District of Antioquia.

Dr. Gonzalo Montes Duque, professor of pharmacology at the National University and former public official of UNRRA, was named secretary of social aid of the Department of Cundinamarca.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Osteopathy: Osteopath's Right to Practice Surgery and Use Drugs.

This was an action to restrain the Governor and Attorney General of Kansas from enforcing the medical and osteopathic practice acts as construed by the Kansas Supreme Court. The hearing was held before a three judge court in the United States district court, district of Kansas, second division.

The plaintiffs, osteopaths licensed under the laws of Kansas, claimed that the Kansas medical and osteopathic practice acts as interpreted by the Kansas Supreme Court are void and in violation of the Fourteenth Amendment of the Constitution of the United States for the reason that such interpretations have prohibited the plaintiffs from using drugs and operative surgery in their practice of osteopathy notwithstanding that in osteopathic schools they are required to study and qualify themselves in the use of drugs and the practice of surgery. This, they said, deprives them of liberty and property without due process of law.

The Kansas Supreme Court has, on several occasions, interpreted the applicable statutes to mean that persons licensed to practice medicine and surgery may use drugs and surgery, while those licensed to practice osteopathy are prohibited from practicing medicine and surgery. Under this construction, certain of the plaintiffs had been personally enjoined from the use of drugs and surgery. The plaintiffs, both by evidence and argument, pointed to their educational qualifications, to the standard of osteopathic colleges generally, to the training received by osteopaths in comparison to that of doctors of medicine and surgery and to the scope of the examination given osteopaths by the state osteopathic board. They asserted that they study the use of drugs and the performance of surgery in their schools to the same extent that medical students do in medical schools and that on graduation they are qualified in these branches of the healing art to the same extent as are graduates from medical schools. They therefore contended that the restrictions placed on them are unreasonable, arbitrary, detrimental to the public health, an unreasonable exercise of the police power, discriminatory and in violation of the Fourteenth Amendment of the United States Constitution.

The court found that as of 1913 (the year in which the osteopathic act was passed) the course of study in osteopathic schools did not include the study of materia medica and pharmacology, that in other respects the course of study in osteopathic schools with regard to the use of drugs and performance of surgery was substantially the same as in medical schools, the pedagogy differing only in emphasis, intensity and degree. It is well settled, said the court, that the police power of the state extends to the regulation of certain trades and callings, particularly those which closely concern the public health. Practitioners of the healing art are properly subject to police regulations, the details of which are primarily with the legislature and are not to be interfered with by federal courts so long as fundamental constitutional rights are not violated. Equal protection of the laws does not preclude states from resorting to classification for various purposes of legislation, and narrow distinctions will justify classification in legislation if they are reasonably related to the objects of legislation. In pursuance of this power, the court continued, Kansas has seen fit to differentiate between the treatment of human ills through the use of drugs and surgery and the treatment of such ills by means of manipulative therapy. In regulating the practice of the two branches of the healing art, different educational requirements are made for each. The examinations given to applicants of each class are distinquishable under the pertinent statutes designed to insure qualified, licensed practitioners in each of the two fields. Kansas has seen fit to set up one board to examine those who would practice surgery and the use of drugs and a separate board to examine those who would practice cure of disease by manipulation or osteopathic practices. It has set up the qualifications which applicants must meet who would take the examination before the medical board for the right to practice surgery and medicine and the qualifications of applicants who would take the examination before the osteopathic board for the right to practice osteopathy. No one would seriously contend that it is arbitrary or unreasonable to compel one who seeks the right to perform surgery or administer drugs and medicines to be a graduate of an approved school or that he take the examination before a board composed of members qualified specially in such subjects. In order for plaintiffs to make a case entitling them to relief under the Fourteenth Amendment, the court continued, it is necessary for them to show that the osteopathic colleges from which they are graduates meet all the educational requirements of the Kansas statutes and of the rules adopted by the medical board for those who would practice surgery and the use of drugs and medicine, that they are approved schools, or that approval has been arbitrarily and unreasonably denied, and that they have been denied the right to take the examination before the medical board. The plaintiffs contended that graduating from osteopathic colleges maintaining comparable courses of study with medical schools and passing the osteopathic board of examination are sufficient to entitle one to the practice of medicine and surgery. With this contention the court did not agree. It is still necessary, said the court, that such schools be approved as provided by law and the appropriate regulations and that graduates therefrom take the examinations before the medical board. Of course, if approval were arbitrarily denied to a qualified osteopathic school and if its graduates were arbitrarily denied the right to take the examination before the medical board, a different question might arise, but such is not the case here. Statutory regulations requiring all applicants for the right to practice surgery and the administration of drugs and medicine to be graduates of approved schools and to take an examination before a medical board composed of members qualified in such subjects are not unreasonable or arbitrary and therefore do not contravene any rights provided by the Fourteenth Amendment.

In a supplemental opinion, after reviewing a number of cases and statements from college catalogs, the court said that osteopathy wholly repudiates drug therapy and sanctions the use of drugs only as anesthetics, external antiseptics, antidotes for poison and possibly as a palliative for pain. Furthermore, osteopathy recognizes that surgery should be employed, when necessary, not as a part of the practice of osteopathy, but as a complement thereto. These catalogs state in substance that the practice of osteopathy and major surgery should not be combined; that the school undertakes to prepare its students to do minor surgery only, to diagnose conditions in cases when major surgery should be resorted to and to give after-treatment in major surgery cases. Such catalogs further state in substance that, while the teaching of surgery has been broadened to meet the demands of patients, osteopathy would never countenance the use of drugs except for the limited purposes stated above. Thus it will be seen, the court continued, that in the year 1913 there were fundamental differences in the osteopathic theory of therapeutics and the practice of osteopathy and the theory of therapeutics of medicine and surgery and the practice of medicine thereof. These fundamental differences fully justified the state in placing the practice of osteopathy in one classification and the practice of medicine and surgery in another classification, in establishing different educational requirements and providing different examinational tests for osteopaths and in restricting osteopaths to the practice of osteopathy, in order to preserve the public health and welfare. It may be that the curricula of the schools of osteopathy have either been broadened or varied since 1913 so as to teach a limited use of drug therapy and so as to better prepare their students for the performance of surgery as a complement to the practice of osteopathy. Osteopathy, however, was a system of treating diseases of the human body without drugs or surgery and colleges cannot change the laws of Kansas

or widen the scope of the osteopath's certificate so as to permit him to practice other systems of healing by the simple expedient of varying their curricula. If an osteopath in Kansas desires to engage in the practice of medicine and surgery, he must meet the requirements laid down for a license so to do. These requirements are attainable by reasonable study and application, are appropriate to the end sought to be attained and are neither unreasonable nor arbitrary. If the osteopathic colleges desire to broaden or vary their curricula so as to train their students not only to practice osteopathy but medicine and surgery, they must meet the requirements to constitute them approved medical schools. Accordingly the injunction requested by the plaintiffs was denied and judgment was entered in favor of the defendants. *—Gleason v. Carlson, 92 F Supp. 280 (Kansas 1948).*[1]

Medical Motion Pictures

The following 16 mm., black and white, sound films are the entire Marriage Series, consisting of five motion pictures produced in 1950 by Affiliated Film Producers for the McGraw-Hill Book Company. They have been planned to complement a textbook, "Marriage for Moderns," prepared by Dr. Henry Bowman, Chairman, Division of Home and Family and Department of Marriage Education at Stephens College, Columbia, Mo. Procurable on purchase from McGraw-Hill Book Company, Inc., Text-Film Department, 330 West Forty-Second Street, New York 18, and on rental from Association Films, Inc., 35 West Forty-Fifth Street, New York 19, or the regional office.

This Charming Couple. Showing time 19 minutes.

This film deals with the reasons why many marriages fail even though both partners are decent, well meaning persons. In the film, the hero and heroine each try to make over the other, instead of accepting each other as human beings with certain strengths and weaknesses that cannot be greatly altered. The situations which are portrayed could each have been worked out with a reasonable degree of satisfaction, had the two young persons been realistic, instead of romantically insisting on a "dream boy" or "dream girl."

This production would elicit stimulating discussion in any young people's group. While the setting is a college campus, groups of young men and women who have not attended college could identify themselves with the human characters shown. Guidance personnel or leaders of young people's groups would also find the film valuable. Skilled leadership for discussion following the film would be necessary, for there are some situations which might be threatening to young people unless they were discussed afterward.

Marriage Today. Showing time 22 minutes.

This motion picture illustrates how two young couples have worked out some of the problems of marriage by being more generous and accepting of one another than the unfortunate pair in "This Charming Couple" were able to be. In both couples, the relationship is always more important than the momentary satisfaction of the individual. Realistic situations, in which one partner cheerfully gives up what he or she wants at the moment to cooperate with and support the other, drive home the lesson of "Marriage Today" vividly and sympathetically.

Unlike the other films of this series, it makes use of a narrator rather than of the conversation between the characters to make its points. The result is that this film tends to become "preachy" in spots. It would probably not hold the attention of a group of young people as well as some of the others in the series. However, the positive encouraging approach of the film is so good that it outweighs any shortcomings it may have.

The film would be useful with college age people, young married couples or for guidance personnel in training. Young people could identify with the real life situations and feel better able to cope with their problems as a result. Discussion under skilled leadership would help young people clarify their ideas about the situations portrayed, but discussion might not be as spirited as with some of the other films.

1. This case was actually decided on Dec. 9, 1948, but it was not published in the Federal Supplement Reporter Series until Oct. 16, 1950.

Choosing for Happiness. Showing time 14 minutes.

Through the conversation and behavior of two girls on a college campus, two different ways of dealing with the opposite sex and choosing a mate are portrayed. Without being at all moralistic in tone, the film shows how the girl who always wants to change her men "for their own good," or who wants someone perfect, is sure to be disappointed. The girl who is somewhat less attractive but more accepting of people does better in the long run. This girl is able to help her more demanding friend see that she must be willing to adjust if she is to find happiness.

This film brings in many kinds of young people, the athlete, the "brain," the quiet one and the strong-willed one. It holds one's interest and is perhaps the most effective of the series, for it is neither a "success story," like "Marriage Today," nor is it in any way threatening, as "This Charming Couple" might possibly be.

Young people from the junior year in high school through college age would enjoy and profit by this film. It would be of value for parents of older adolescents or for teachers and guidance personnel. Discussion following the showing of this film should be provocative and lively. Like the others in this series, it could well stand alone; it would appeal to a wider age group then almost any of the others.

It Takes All Kinds. Showing time 20 minutes.

This film portrays, in a series of young people, the humorous and kindly reaction of different kinds of personalities in a tense situation. Each type of personality is shown with a member of the opposite sex, and his or her characteristic way of meeting situations is portrayed in terms of what he or she says and does on a date. The point of the picture is that in order to make a happy marriage, the partners do not have to be alike but must accept each other as they are.

The narration and conversation are skilfully combined in this film to make the different reactions of individuals, when the car runs out of gas, seem intensely human and distinctly different from each other. The author of the film has shown the strengths and weaknesses of each type so that one is left with the feeling that successful persons must all behave alike. The only possible criticism might be that somewhere in the film the statement could have been made that one does not always react in the same way to similar events, and that we all have some slight mixture of many different types of behavior. The need for even the most independent to be occasionally dependent or for the dependent to become dictatorial on occasion might have been brought out to good advantage.

This film could be used not only for college age groups but for high school students or adults. It is more than preparation for marriage; it is excellent mental hygiene.

Who's Boss? Showing time 16 minutes.

The theme of this picture is the married couple who work for the same newspaper and who have careers to further. The woman is the dominant one and is less appealing. The couple realize the competitive situation is dangerous to their marriage and work hard to straighten out their difficulties. They are shown over a period of time in which they make a good adjustment. The woman gives up most of her professional work to devote herself to her children. The man, too, makes some compromises, so that his wife can also use her talents productively in her profession.

The film is good for young people of college age or young married couples. The way that the hero and heroine work out their serious difficulties and the troubles they have along the way seem real and valid. The film holds one's interest and will undoubtedly make for spirited discussion. Skilful leadership will help to make the discussion fruitful.

A 35 mm. filmstrip accompanying each motion picture will aid in stimulating discussion following the showing of each film.

Although produced primarily for college courses in marriage and family living, these films will find acceptance among a variety of adult groups—professional, educational and civic. These films might be better used singly or two at a time, since each film necessitates thorough discussion under skilled leadership.

The photography, narration and direction are excellent.

CURRENT MEDICAL LITERATURE

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in Continental United States and Canada for a period of five days. Three journals may be borrowed at a time. Periodicals are available from 1939 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied with stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Journal of Diseases of Children, Chicago

80:363-532 (Sept.) 1950

Application of Nutrition Research to Everyday Practice. P. C. Jeans. —p. 363.
Growth and Development of Negro Infants: II. Relation of Birth Weight, Body Length and Epiphysial Maturation to Economic Status. A. Kessler and R. B. Scott.—p. 370.
*Vitamin D Intoxication in Child with Rheumatoid Arthritis. J. S. Hyde and J. B. Richmond.—p. 379.
Toxic Lesions of Pancreas. P. V. Véghelyi, T. T. Kemény, J. Pozsonyi and J. Sós.—p. 390.
Primary Sarcoma of Liver: Report of Case. G. Willeford and V. A. Stembridge.—p. 404.
*Pulmonary Toxicity of Wetting Agents Dispensed as Aerosols. G. C. Hall Jr.—p. 408.
Treatment of Patient with Cleft Palate: Present Day Concept of a Pediatric Responsibility. D. B. Coursin.—p. 442.

Vitamin D Intoxication.—Hyde and Richmond report a girl who had had rheumatoid arthritis since infancy. The right knee continued to be the only affected joint until she reached 4 years of age, when, within several weeks, pain, swelling and limitation of motion of the joints of the hands and feet developed. Pain and limitation of motion of the spine also developed. The appetite became poor, and gain in weight was slow. The joint deformities gradually became more pronounced, and weakness and easy fatigability developed. High potency vitamin D was given orally in doses of 2 to 3 capsules (100,000 to 150,000 U. S. P. units) each day, from the development of multiple joint symptoms at 4 years of age to the time of her first admission to the hospital on March 10, 1947. This was a total of five and one-half years of therapy. The authors first saw the child when she was about 10 years of age. During the period of treatment with large doses of vitamin D, anorexia, vomiting, polydipsia, polyuria, nocturia, calcification of blood vessels, of periarticular soft tissue, of conjunctivas and of corneas, hypertension, hypertensive retinopathy and renal insufficiency had developed in the child. Some amelioration of symptoms was noted after the discontinuance of vitamin D therapy, but there was no significant improvement in the renal function after two years of observation, indicating irreversible kidney damage. When vitamin D is used in large doses, the renal function should be studied before and after treatment. The toxic effects are reversible if use of the drug is discontinued soon enough. The symptomatic improvement which is related to the sedative effect of hypercalcemia probably warranted experimentation with massive doses of vitamin D for rheumatoid arthritis in the past, but present knowledge of the toxic effects and the recent information concerning endocrine factors in rheumatoid arthritis should now invalidate massive vitamin D therapy.

Pulmonary Toxicity of Wetting Agents in Aerosols.—Hall says that wetting agents are used for the following purposes: (1) to increase fat absorption in cases of pancreatic fibrosis, (2) as mucigogic agents in the treatment of peptic ulcers, (3) as ingredients of dentifrices, (4) as solvents for penicillin aerosols, (5) to wet down dusts in mines and (6) in combination with sulfonamides to increase the moisture in croup tents in the treatment of children with laryngotracheobronchitis and similar diseases. The two radicals in these compounds are a long hydrocarbon chain, which is the lipophilic or hydrophobic group, and a short SO_4Na group, which is the lipophobic or hydrophilic group. In the experiments described by the author, guinea pigs were used. The various wetting agents were dispensed in concentrations of 1.0, 0.5 and 0.1 per cent, and atmospheric air was used to convert the solution to aerosol. The animals were exposed for eight hours a day for six days. After a week those not already dead were killed and studied. Histological sections were made of the trachea, bronchi and lungs. Sodium laurylsulfate, alkylaryl sulfonate, synthetic primary alcohol sulfate and sulfonated ester of dicarboxylic acid were studied. These were toxic in proportion to their concentration. Toxic effects consisted in degeneration and desquamation of alveolar epithelium. In 0.1 per cent concentration the agents are apparently nontoxic to guinea pigs. Limitation of the concentration of wetting agents to 0.1 per cent in experimental investigation in man is perhaps advisable.

American Journal of Medical Sciences, Philadelphia

220:117-236 (Aug.) 1950

Influence of Arterial Disease on Systolic Blood Pressure Gradients of Extremity. T. Winsor.—p. 117.
*Treatment of Angina Pectoris with Preparation of Khellin (Ammi Visnaga). C. A. Armbrust Jr. and S. A. Levine.—p. 127.
Hypertrophy of Branches of Pulmonary Artery, and Its Possible Relationship with So-Called Primary Pulmonary Arteriosclerosis in Two Infants with Hypertrophy of Right Heart. M. Wolman.—p. 133.
Acute Primary Pericarditis. I. A. Feder, J. Hoffman and H. Sugar. —p. 144.
Dosage-Response Curve for Comparison of Mercurial Diuretics. D. A. Clarke, W. Modell, T. Greiner and others.—p. 156.
Distribution of Radiomercury of Mercurial Diuretic in Some of the Body Fluids of Man. C. T. Ray, G. E. Burch, S. A. Threefoot and F. J. Kelly.—p. 160.
*Studies on Use of Aureomycin in Hepatic Disease: III. Note on Aureomycin Therapy in Hepatic Coma. J. D. Farquhar, J. Stokes Jr., C. M. Whitlock Jr. and others.—p. 166.
*Id.: IV. Aureomycin Therapy in Chronic Liver Disease with Note on Dermal Sensitivity. J. M. Shaffer, L. W. Bluemle Jr., V. M. Sborov and J. R. Neefe.—p. 173.
Dilatation of Bile Ducts and Intrahepatic Lesions with Obstructive Jaundice in Rats Fed Diets Deficient in Vitamin A. C. J. Hamre. —p. 183.
Elevated Titers of Serum Heterophil Antibodies in Three Instances of Monocytic Leukemia. G. Carpenter, J. Kahler and E. B. Reilly. —p. 195.
Effect of Procaine Administered Intravenously on Cutaneous Pain Threshold. R. F. Kibler and H. W. Schnaper.—p. 199.
Effect of Fat-Free Diet in Causing Low Serum Cholesterol. S. M. Mellinkoff, T. E. Machella and J. G. Reinhold.—p. 203.
Pituitary Versus Primary Thyroid Myxedema. A. Despopoulos and W. H. Perloff.—p. 208.
Treatment of Patient with Hyperthyroidism. A. Large and N. Taylor. —p. 213.
Nystagmus: Its Mechanism and Significance. W. F. Gorman and S. Brock.—p. 225.

Visammin in Angina Pectoris.—Visammin (2-methyl-5, 8-dimethoxyfuranochromone) is one of the three active crystalline substances that has been isolated from the fruit of Ammi visnaga Lam, a plant which grows wild in the eastern Mediterranean countries. Armbrust and Levine employed the drug in the treatment of 53 ambulatory patients with angina pectoris. The dose was generally 40 mg. three times daily, given by mouth. The patients carried on their usual activities. Placebos identical in appearance were used for a time as controls. About 60 per cent of the patients showed improvement, i. e., used fewer nitroglycerin tablets, had fewer and milder attacks of pain and could walk greater distances. There were undesirable side effects, such as nausea, anorexia and dizziness, in

more than half of the patients. These were a real deterrent to the use of the drug in many instances. There is a need for a long-acting coronary vasodilator. Visammin may meet this need in an appreciable number of patients, if the untoward side effects can be controlled. Since the drug has a cumulative effect, an initial dose may be given to obtain an effective blood level, and then the amount of the daily dose may be lowered.

Aureomycin Therapy in Hepatic Coma.—Farquhar and his associates gave aureomycin, in addition to numerous supportive measures, to four patients having acute liver failure with coma. In two instances the liver failure complicated viral hepatitis; in the other two, portal cirrhosis was the complicating factor. In the experience of most observers, the mortality rate in cases of hepatic coma, particularly if the coma follows viral hepatitis, has been high despite many types of supportive treatment. The four consecutive patients with acute hepatic coma showed improvement on receiving aureomycin in addition to supportive therapy. The response to aureomycin was sufficiently striking in the first two cases and in the fourth case to suggest strongly that improvement was due to the activity of this drug. In the fourth case the cessation of coma appeared to be clearly related on three successive occasions to the administration of the drug. This action could have occurred in the intestinal tract or by antibacterial action within the liver itself, or possibly within the circulatory system.

Aureomycin in Chronic Liver Disease.—Shaffer and his collaborators report on a group of 13 patients with chronic liver disease whom they treated with aureomycin. The patients were under observation for four to 15 months. Nine of the patients gave a history of what appeared to be acute viral hepatitis with jaundice at some time prior to the present hospitalization. Another patient, although not having a clearcut history of hepatitis, had been exposed to viral hepatitis during World War II. Two patients had had portal cirrhosis, probably of alcoholic origin. In a patient with hepatosplenomegaly and abnormal hepatic function tests, the causative agent could not be ascertained. The usual dose of aureomycin was 2 Gm. per day for 30 days. In seven cases improvement resulted which may have been related to aureomycin therapy. In six cases there was little or no evidence of benefit from aureomycin. Dermal sensitivity manifested by skin and nail changes was observed in five cases. In four of these, the lesions appeared after exposure to sunlight, indicating the possibility that in some circumstances aureomycin may be a photosensitizing agent. The results of this study suggest that aureomycin therapy may be of value in some types of chronic liver disease.

American Journal of Physiology, Baltimore

162:489-730 (Sept.) 1950. **Partial Index**

Further Investigations on Effect of Anoxia on Convulsions. E. Gellhorn and H. M. Ballin.—p. 503.
Effect of Normal and Abnormal Respiration of Hemodynamics of Experimental Interatrial Septal Defects. G. A. Brecher and D. F. Opdyke. —p. 507.
Factors in Variation and Regulation of Coronary Blood Flow in Intact Anesthetized Dogs. E. L. Foltz, R. G. Page, W. F. Sheldon and others.—p. 521.
Carotid-Occlusion-Pressor Reflex: Influence of Existing Mean Arterial Pressure of Anesthetics and of Ganglionic- and Adrenergic-Blocking Drugs. G. Prochnik, G. L. Maison and J. W. Stutzman.—p. 553.
Evidence for Conversion of Carbon Monoxide to Carbon Dioxide by Intact Animal. R. T. Clark Jr.—p. 560.
Hepatic Uptake and Biliary Excretion of Bromsulphthalein in Dog. R. W. Brauer and R. L. Pessotti.—p. 565.
Secretion of Radio-Calcium in Milk. A. H. W. Aten Jr. and C. B. Heyn.—p. 579.
Relaxation of Pelvic Ligaments in Guinea Pigs by Acetylcholine. W. C. Young and F. E. Emery.—p. 606.
Traumatic Shock: XVII. Plasma Fibrinogen in Hemorrhagic Shock in Dog. E. D. Frank, H. A. Frank and H. Fine.—p. 619.
Renal Clearance of Sodium in Dog: Effect of Increasing Sodium Load on Reabsorptive Mechanism. E. E. Selkurt and R. S. Post.—p. 639.
Effect of Water-Soluble Vitamins on Thrombin and on Enzymatic Inactivation of Thrombin. G. Weber and K. Drechsler.—p. 665.
Effect of Sustained Expansion of Extracellular Fluid Volume on Filtration Rate, Renal Plasma Flow and Electrolyte and Water Excretion in Dog. L. G. Weston Jr., W. P. Anslow Jr., L. G. Raisz and others. —p. 677.
Changes in Blood Plasma of Guinea Pig During Acute Radiation Syndrome. H. I. Kohn.—p. 703.
Hematologic Changes and Death in Vitamin B12-Deficient Rats. H. J. Borson, D. Singman, S. Lepkovsky and others.—p. 714.

American Journal of Surgery, New York

80:139-256 (Aug.) 1950

*Hindquarter (Interinnomino-Abdominal) Amputation. J. H. Saint.—p. 142.
Fractures of Shaft of Femur. A. A. Grebe.—p. 161.
Traumatic Subcutaneous Injuries to Pancreas. L. T. Wright, A. Prigot and L. M. Hill.—p. 170.
Penetrating Wounds of Chest. W. E. Walsh, J. G. Stubenbord and R. W. Tawse.—p. 176.
Hypospadias. A. A. Schaefer and J. Erbes.—p. 183.
Intrinsic Lesions of Stomach: Review of 458 Cases. A. B. Ragins and H. Cohen.—p. 192.
Physiopsychologic Treatment for Postoperative Urinary Retention. P. Treiger, J. J. Tovarek and N. A. Casciato.—p. 195.
Acute Diverticulitis of Large Bowel. L. S. Fallis and M. R. Marshall. —p. 198.
Chlorophyll and Wound Healing: Experimental and Clinical Study. C. R. Lam and B. E. Brush.—p. 204.
Thyroidectomy Using Local Anesthesia. D. E. Ross.—p. 211.
Safe Method of Inducing Local Digital Anesthesia. H. E. Hippe. —p. 216.
Acute Retrocecal Appendicitis. L. K. Stalker and P. G. Brandetsas. —p. 218.
Appendicitis in Rural Hospital: Ten-Year Statistical Survey. J. H. Mitrani.—p. 221.
Chronic Backache in Compensation Cases. S. Kleinberg.—p. 224.
Method of Treatment of Bennett's Fracture Dislocation. C. J. Wagner. —p. 230.
Simplified Technic for Closures of Thin, Friable Hernial Sacs. M. Volpe and E. Salmeri.—p. 232.

Hindquarter (Interinnomino-Abdominal) Amputation.—According to Saint hindquarter or interinnomino-abdominal amputation was first performed, although unsuccessfully, by Billroth in 1891. For the following two or three decades the number of cases in which this operation was attempted was small and the mortality rate high. In recent years the mortality rate has been reduced to about 15 per cent. The indications for the performance of this amputation as now established are more or less restricted to tumor formation, involving either the innominate bone itself or the tissues of the upper thigh, bony, soft or articular, to such an extent that a disarticulation through the hip joint obviously could not be expected to result in complete ablation of the disease. The author reports a case of osteosarcoma of the innominate bone with amputation about four months after the appearance of the tumor. The patient left the hospital on his sixteenth postoperative day with the wound completely healed. This the author believes to be the shortest period of postoperative hospitalization yet recorded following this amputation. A roentgenogram of the chest eight weeks after operation showed the presence of metastatic involvement of both lungs, although at this time the patient was feeling well. He died at home about a month later. This case serves to emphasize the paramount neecssity of early diagnosis of malignant disease if the rational treatment of adequate removal of the primary tumor is to be successful.

80:257-380 (Sept.) 1950

Rupture of Uterus. C. A. Gordon, A. H. Rosenthal and J. L. O'Leary. —p. 259.
*Placental Barrier in Carbon Monoxide, Barbiturate and Radium Poisoning: Some Original Observations in Humans. H. S. Martland and H. S. Martland Jr.—p. 270.
Delayed Suture in Management of Wounds: Analysis of 721 Traumatic Wounds Illustrating Influence of Time Interval in Wound Repair. K. F. Lowry and G. M. Curtis.—p. 280.
Primary Carcinoma of Jejunum. F. Cunha and B. M. Day.—p. 288.
Hyperextension Injuries to Finger Joints. F. J. Roemer.—p. 295.
Intertrochanteric Fracture of Hip. G. S. Leventhal.—p. 303.
Congenital Coxa Vara. F. W. Hark.—p. 305.
Lymphomas of Anorectum. E. Granet, M. B. Kagan and C. Solomon. —p. 311.
Diagnosis of Cancer of Rectum by Cytology. J. E. Ayre.—p. 316.
Carcinoma of Colon and Rectum. F. Portmann.—p. 318.
Bilateral Renal Calculi. C. W. Collings and I. E. Martin.—p. 323.
Traumatic Aneurysm of Radial Artery. A. J. Goldyne and H. L. Gardner.—p. 326.
Surgical Treatment of Varicocele. R. A. Price.—p. 330.
Sciatic Scoliosis. S. Kleinberg.—p. 332.
Esophageal Intubation for Repair of Pharyngo-Esophageal Diverticulum. R. N. Terry.—p. 338.
Appendicitis in the American Negro. J. R. Ford and C. R. Drew. —p. 341.

Placental Barrier in Poisoning.—Martland and Martland cite autopsies on two pregnant women who had succumbed to carbon monoxide asphyxiation. These revealed that carbon monoxide does not cross the placental barrier, because of its

rapid fixation within the red blood cells of the mother. This is also evidence against the theory of transplacental transfer of red blood cells between mother and fetus. A doubt is therefore raised as to the correctness of the present theories of Rh isoimmunization. The authors report the first human case in which the placental transfer of barbiturates has been demonstrated by quantitative organ analysis of the mother and her fetus. The barbiturates accumulate in the fetus to a level almost twice that of the mother because of the slower and less efficient detoxication and excretory mechanisms of the fetus. This "pooling" tendency in the fetus of most of the sedatives given by the oral, rectal, parenteral or inhalation routes may explain the increased neonatal morbidity and mortality resulting from the use of such agents during labor. Seventeen children of ten mothers, who had been luminous watch dial painters, were examined for radium deposits. None showed amounts of radioactivity in excess of 0.01 microgram, which is considered the upper limit of normal radioactivity in the human body. This does not prove, however, that the gaseous emanations present in the mother's blood do not cross the placental barrier; should they do so, radioactive deposits in the children would be too small to produce harmful results. Gamma ray measurements were made in all 17 children. The more sensitive breath radon tests were used on three children who showed radioactivity in the gamma ray measurements. These observations should be put on record in view of the present interest in the biologic effects of atomic energy. Internal poisoning by ingestion, inhalation or parenteral injections of long-lived radioactive substances, in which permanent radioactive deposits can be detected and measured during life and after death, is not to be confused with the deleterious effects caused by excessive external exposure to roentgen rays, excessive amounts of radioactive material or the explosion of atomic material. Such external exposures rarely render the person radioactive. Internal poisoning by radioactive substances has been characterized mainly by anemias of the pseudoaplastic type (large doses), radiation osteitis, necrosis of the jaws and temporal bones and osteogenic sarcomas, since essentially all the retained radioactive substances are eventually stored in the bones. When the portal of entry has been chiefly the respiratory tract, bronchiogenic carcinomas have occurred. No effects on the generative organs have been noted, and sterility and genetic mutations are not a problem.

American Review of Tuberculosis, New York

62:231-336 (Sept.) 1950

*Boeck's Sarcoid: Review Based upon Clinical Study of 52 Cases. E. A. Riley.—p. 231.
Genetic Studies on Development of Resistance to Neomycin and Dihydrostreptomycin in Mycobacterium Ranae. Jen-Yah Hsie and V. Bryson. —p. 286.
Effect of Neomycin on Tubercle Bacillus and in Experimental Tuberculosis of Guinea Pigs. W. Steenken Jr., E. Wolinsky and B. J. Bolinger.—p. 300.
Electrocardiograms with Prominent S Waves in All Standard Limb Leads: Associated Patterns in Multiple Precordial Leads. W. Weiss. —p. 307.
Study of 200 Cases of Tuberculous Pleurisy with Effusion. J. C. Sibley. —p. 314.

Boeck's Sarcoid.—Riley's study of Boeck's sarcoid is based on 52 patients with generalized sarcoidosis seen at Bellevue Hospital between 1939 and 1949. The average length of follow-up on the entire group has been four years and eight months. The author presents a clinical study of the cases and a review of the literature. Boeck's sarcoid is a chronic, infectious, granulomatous disease, which in this country shows a predilection for young Negro adults. The etiology of sarcoidosis remains obscure. There is a close relation between sarcoidosis and tuberculosis, although its exact nature is not clear. There is no direct evidence that Boeck's sarcoid is caused by the tubercle bacillus. Although the disease may show complete regression, its benignity has been greatly overemphasized. The eventual outcome of this disease and the development of directly related complications are uninfluenced by any therapy. The mortality in this series has been almost 20 per cent; in an additional 13 per cent of the patients, clinically active tuberculosis has developed during the period of follow-up. These figures do not include the high percentage of patients with irreversible ocular and pulmonary damage. The term "benign lymphogranulomatosis" is misleading by its implication and probably should be abandoned.

Annals of Western Medicine & Surgery, Los Angeles

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*Seminal Vesiculitis: Disease Entity Sometimes Confused with Appendicitis. M. Russell.—p. 518.

Seminal Vesiculitis Confused with Appendicitis.—A congested or inflamed seminal vesicle may simulate appendicitis in young men. A postoperative quest for the source of the recurrent abdominal pain will lead to the adnexa in the male almost as often as in the female. Seminal vesiculitis, even when focal and primary, occurs not as a local lesion but always as a stage of generalized infection of the genital tract. It is most commonly an ascending infection, complicating urethritis or prostatitis. When the presenting symptom is pain in the right lower quadrant associated with nausea, vomiting and elevation of temperature, it may well be confused with appendical inflammation. However, the vesicular pain is usually dull and aching rather than sharp and stabbing. The initial epigastric distress which precedes the pain of appendicitis is seldom present, and the nausea and vomiting are not as constant and severe. With concomitant urethral involvement, a discharge may be present before the onset of the abdominal symptoms. In bilateral vesiculitis, which is more frequently encountered than unilateral involvement, the differential diagnosis is less difficult. Palpation of the abdomen reveals tenderness in the lower quadrants. Where the left vesicle is minimally or not at all involved and the symptoms are confined to the right side, confusion and possible error may result. Careful rectal examination may furnish a clue to the confusing picture of abdominal pain. The inflamed vesicles may become distended with purulent material and edema fluid so that they can be palpated as sausage-like projections above the prostate gland. The pressure of the examining finger on the vesicle will produce local pain and will also reproduce the abdominal pain. This latter observation is almost diagnostic.

Archives of Dermatology and Syphilology, Chicago

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Scientific Work of Paul Gerson Unna: In Commemoration of One Hundredth Anniversary of His Birth. A. Hollander.—p. 351.
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Arch. Indust. Hygiene and Occupat. Medicine, Chicago

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Archives of Internal Medicine, Chicago

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*Clinical Studies with ACTH and Cortisone in Renal Disease. G. W. Thorn, J. P. Merrill, S. Smith III and others.—p. 319.
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*Hepatic Insufficiency and Cirrhosis in Diabetes Mellitus. J. J. Frankel, C. E. Asbury Jr. and L. A. Baker.—p. 376.
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Recent Progress in Insulin Physiology. E. Bruch.—p. 427.
Gastroenterology: Partial Review of Literature from July 1948 to July 1949. J. B. Kirsner, W. L. Palmer, W. E. Ricketts and others. —p. 443.

ACTH and Cortisone in Renal Disease.—Thorn and co-workers treated 26 patients with renal disease with adrenal hormones. Four patients with acute glomerular nephritis were given 80 to 100 mg. of pituitary adrenocorticotropic hormone (ACTH) daily for five to 13 days, the total dose ranging from 0.18 to 1.20 Gm. Seven patients with subacute or chronic nephritis were treated with pituitary adrenocorticotropic hormone or cortisone, the total dose ranging from 0.36 to 2.2 Gm. Six patients in the nephrotic stage of chronic glomerular nephritis were likewise treated with one drug or the other, the total dose ranging from 0.40 to 2.8 Gm. Six patients with lupus erythematosus disseminatus had evidence of renal disease manifested by albuminuria and hematuria. They were treated with pituitary adrenocorticotropic hormone in doses of not less than 100 mg. daily, the total dose ranging from 0.90 to 7.5 Gm. One to four courses of treatment were given, a single course usually lasting for two weeks. Three patients with dermatomyositis and proteinuria were treated with both hormones. There was no conclusive evidence in the small series of patients that these agents exert any beneficial effect on the over-all course of acute, subacute and chronic nephritis. Pituitary adrenocorticotropic hormone therapy appeared to be an effective method of inducing diuresis in patients with the nephrotic syndrome. Often diuresis may be induced by a relatively short period of treatment. Metabolic studies of patients with nephrosis treated with both hormones revealed differences in response of respiratory quotient, thyroid function, cholesterol and phospholipid levels from the response under similar conditions in normal persons and in patients with Addison's disease.

Liver Insufficiency in Diabetes Mellitus.—Frankel and co-workers performed various liver function tests on 139 diabetic patients and found 46 with abnormal reactions. The hepatic insufficiency could be explained by factors other than diabetes mellitus, such as chronic alcoholism and cardiac disease with episodes of failure in 28 patients. Diabetes was the only disease present which could explain the impaired liver function in the remaining 18 patients. The hepatic dysfunction varied directly with diabetic control. Diagnosis of cirrhosis and diabetes mellitus was made in 36 of 3,543 patients who were admitted to a Veterans Administration Hospital. Thirty-one of the 36 patients were chronic alcoholics. The diabetes preceded cirrhosis in 15 patients, while in 21 the reverse was true. All except one of these 15 patients had been a heavy consumer of alcohol for many years. There were six patients whose diabetes mellitus had been diagnosed five years or more before cirrhosis. Diabetes was observed to be the only possible causative agent for the cirrhosis in only one patient, an incidence of 0.028 per cent. Fourteen of the 21 patients whose diabetes preceded cirrhosis required insulin to control the hyperglycemia. Six of the 15 patients whose cirrhosis preceded diabetes required insulin. The incidence of hepatomegaly and fatty infiltration in adults with diabetes mellitus is low. Hepatic dysfunction in diabetes mellitus is of low incidence but is transient and seldom leads to permanent damage.

Archives of Otolaryngology, Chicago

52:323-512 (Sept.) 1950

*Mechanism of Suffocation in Spinobulbar Poliomyelitis and Experiences with Operative Treatment. A. Sjöberg.—p. 323.
*Tracheotomy in Poliomyelitis. R. J. Strobel and N. Canfield.—p. 341.
Arteriovenous Aneurysm of Internal Carotid Artery in the Cavernous Sinus. L. M. Freedman.—p. 351.
Effect of Autonomic Denervation on Nasal Mucosa: Interruption of Sympathetic and Parasympathetic Fibers. A. F. Millonig, H. E. Harris and W. J. Gardner.—p. 359.
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Ménière's Syndrome: Proposed Classification and Differential Diagnosis. B. Rachlis.—p. 373.
Syndrome of Bilateral Vestibular Paralysis and Its Occurrence from Streptomycin Therapy. P. Northington.—p. 380.
*A Study of the Deafness Heritage in Otosclerosis. S. J. Kopetzky. —p. 397.
Chemical Burns of the Oral Cavity and Esophagus. A. V. Stumboff. —p. 419.
The Paranasal Sinuses. S. Salinger.—p. 427.

Suffocation in Poliomyelitis.—Sjöberg discusses the enthusiasm for tracheotomy in bulbar poliomyelitis which has swept over the United States in recent years. In Stockholm the problem became acute during 1949 when there were many cases of severe bulbar poliomyelitis. The author agrees with the opinion prevailing in the United States that the majority of fatalities in the early stages of poliomyelitis are due to suffocation and not to circulatory paralysis. The mortality rate for patients treated in Sweden with the respirator during the 12 year period 1934-1945 was 86 per cent (119 survived of 834). Of the 14 patients subjected to tracheotomy at Sjöberg's hospital, 12 survived. Tracheotomy is indicated in the following five groups: 1. Peripheral respiratory paresis with retention of secretion. 2. Aspiration (of saliva and vomitus) in purely bulbar cranial nerve lesions (above all, in paralysis of the vagus). 3. Bilateral paralysis of the laryngeal abductors combined with bilateral paresis of the pharynx. 4. Spinobulbar lesions, manifesting themselves in a bilateral paresis of the pharynx (plus, in certain cases, nuclear paresis of the accessory nerve plus injuries to the first and second cervical segments of the spinal cord). Suffocation in these cases is chiefly characterized by the angle, or rope dent symptom, which constitutes an alarm signal. The patient risks being strangled by a contracture or tonus excess in his nonparalyzed antagonistic muscles, which draw the hyoid bone backward and upward. If, in addition, a nuclear paresis of the accessory nerve occurs, the rope dent symptom is further accentuated, and the patient's condition is aggravated. 5. Cases in which the operative treatment is applied prophylactically. The respirator treatment may be harmful and can even hasten death by suffocation if bronchoscopic suction with or without tracheotomy is not applied simultaneously. Postural drainage with oxygen or an oxygen-carbon dioxide mixture (carbogen) is absolutely necessary. During the first and sometimes even during the second week the fluid balance must be carefully controlled and the liquid administered only parenterally in isotonic or hypertonic form. Dextran and blood transfusions proved effective in the initial shock condition, which often appears in the hours following tracheotomy.

Tracheotomy in Poliomyelitis.—A total of 166 patients with poliomyelitis were admitted to the New Haven Community Hospital in 1949. Of these, 17 had bulbar poliomyelitis, and 10 of them were subjected to a tracheotomy. Strobel and Canfield believe that tracheotomy should be considered whenever a patient in a respirator exhibits signs of bulbar involvement or shows persistent cyanosis or struggling. Patients not in a respirator require therapeutic tracheotomy when they are unable to keep the airway free of secretions, as evidenced by moist rales, choking and cyanosis. Most patients with bulbar involve-

ment who are not in a respirator will complain of difficulty in swallowing. A prophylactic tracheotomy should be considered whenever early and progressive bulbar signs are present and before the patient has difficulty, or when a long siege in the respirator seems probable, even though no bulbar signs are present. A patient with severe respiratory paralysis may have difficulty handling pharyngeal mucus because of inability to cough effectively. A certain number of these prophylactic tracheotomies might be life-saving. However, it is impossible to forecast how many of the patients in a respirator will have enough difficulty to need a tracheotomy, and some needless tracheotomies might be done. In a desperately ill patient in need of a tracheotomy, it is probably more dangerous to delay the tracheotomy than to perform it. The authors admit that five of the 10 patients in whom they performed a tracheotomy died, but in none of these patients was death attributable to the operation. The tracheotomy was probably life-saving for every one who survived. Earlier tracheotomy in three of the five who died might have been life-saving.

Hereditary Deafness in Otosclerosis.—From an earlier study on 581 cases of deafness, Kopetzky concludes that a chemical abnormality in the blood is the evolutionary basis of the lesions of otosclerosis. In familial groups, biochemical changes in the blood were so similar that a study of the hereditary character of deafness in otosclerosis was begun. In one case, the parents were unaware of having any loss in hearing acuity; nevertheless, their blood showed that they carried a metabolic mechanism defect. They had transmitted this defect to their child, who was a congenital deaf-mute. The child had both pyruvemia and hypercholesteremia. The father had only pyruvemia, and the mother's blood showed both pyruvemia and hypercholesteremia. The hereditary character of deafness is discussed on the basis of 25 deaf-mutes, 5 severely deafened children and 25 children with limited hearing. The relations between the biochemical abnormalities in the blood and the cellular abnormality of the otic capsule in otosclerosis are discussed. Persons with congenital deafness have hereditary defects of carbohydrate metabolism which lead to otosclerotic lesions on the otic capsule in intrauterine life, or they carry in their blood the biochemical-pathological changes of otosclerosis, and lesions develop after birth. The blood biochemistry gives an explanation as to why the cellular pathological changes of the otic capsule must result. Heretofore, this explanation was impossible, although the evolution of the pathological picture was known. The author suggests a diagnostic triad which does not depend on any statement of the patient or his family concerning deafness in the family. He discusses the possibility of replacement therapy, to supply the essential items which are indicated by the presence of pyruvemia alone or pyruvemia and hypercholesteremia.

Archives of Physical Medicine, Chicago

31:557-612 (Sept.) 1950

Influence of Microwave Diathermy on Swelling and Trismus Resulting from Odontectomy. R. Q. Royer, K. G. Wakim, S. A. Lovestedt and F. H. Krusen.—p. 557.
*Sterilization of Water in Hydrotherapeutic Tank by Underwater Use of Ultraviolet Rays. H. Z. Jern and J. D. Currence.—p. 566.
Clinical Electromyography: Physiologic Basis, Instrumentation, Diagnostic Value. G. G. Hirschberg and A. S. Abramson.—p. 576.
Prevention of Ultraviolet Erythema by Topical Application of Pyribenzamine. B. B. Grynbaum, W. Bierman and A. Kurtin.—p. 587.
Transfer of Respirator Patients. C. W. Dail, E. Austin, O. L. Huddleston and others.—p. 592.
Educational Therapy in Rehabilitation of the Tuberculous. E. E. Gordon and E. C. Phillips.—p. 595.
Ambulation of Patients with Spastic Hemiplegia: Further Observations. L. J. Yamshon and C. C. Troensegaard.—p. 599.

Sterilization of Water in Hydrotherapeutic Tank by Ultraviolet Rays.—Jern and Currence say that, although ultraviolet rays have been used for the sterilization of drinking water and for the disinfection of swimming pools, they could find no record of the underwater use of ultraviolet rays as a sterilizing agent in hydrotherapeutic practice. They conducted studies to determine the efficacy of underwater ultraviolet rays in the disinfection of hydrotherapeutic tanks. Various organisms, such as Escherichia coli, Staphylococcus aureus, enterococci, psuedoanthrax bacilli and Trichophyton mentagrophytes were added to tank water in a test of the action of ultraviolet rays. Under conditions simulating hydrotherapeutic treatment, a considerable portion of the seeded organisms were destroyed prior to exposure to ultraviolet rays by a temperature of 44 C. by chlorine (0.06 to 0.2 parts per million of tank water) and by the water itself. In order to obtain a maximum survival of bacteria for an estimation of the true bactericidal power of ultraviolet rays, dechlorinization of water was accomplished by the addition of sodium thiosulfate or broth. Sodium thiosulfate appeared to be preferable to broth. Various numbers of the micro-organisms, up to 2,000,000 per milliliter of water, were subjected to 20 minutes of exposure to ultraviolet rays, with complete sterilization. The authors conclude that the underwater use of ultraviolet rays can be recommended as a reliable sterilizing procedure. For optimum effects the water should be simultaneously agitated to permit exposure to the rays of every particle of contaminated water.

Archives of Surgery, Chicago

61:387-592 (Sept.) 1950

*Sludged Blood Following Severe Thermal Burns. F. Brooks, L. R. Dragstedt, L. Warner and M. H. Knisely.—p. 387.
Postoperative Alterations in Coagulation Mechanism of Blood: Observations on Circulating Thromboplastin. R. Warren, M. O. Andur, J. Belko and D. V. Baker.—p. 419.
*Prostatic Cancer: Further Investigation of Hormonal Relationships. H. Brendler, W. E. Chase and W. W. Scott.—p. 433.
*Carcinoma of Prostate Gland: Results of Conservative Management. L. R. Reynolds, T. L. Schulte and H. J. Hammer.—p. 441.
Anatomic Study of Portal Vein and Its Main Branches. R. S. Gilfillan.—p. 449.
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Management of Bleeding Peptic Ulcer. J. B. Holloway Jr., T. Armour Jr. and W. H. Proctor Jr.—p. 487.
Local and Systemic Effects of Heat and Cold in Rats. F. K. Safford Jr., J. R. Lisa and F. M. Allen.—p. 499.
Experiments on Local Hypothermia for Treatment of Burns and Frostbite. F. M. Allen and F. K. Safford Jr.—p. 515.
Pseudocysts of Pancreas; Total Excision: Report of Case. D. C. Collins.—p. 524.
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Adhesions Resulting from Removal of Serosa from Area of Bowel: Failure of "Oversewing" to Lower Incidence in Rat and Guinea Pig. J. W. Thomas and J. E. Rhoads.—p. 565.
Excretory Urography Versus Retrograde Urography: Ureteral Compression Technic. J. B. Beare and C. A. Wattenberg.—p. 568.
Present Day Methods of Disinfecting Skin: Survey of Disinfectants and Technics Currently Employed in Hospitals of United States and Canada. P. B. Price.—p. 583.
New Simplified Technic for Localization of Foreign Body. L. W. Breck and D. J. Maylahn.—p. 589.

Sludged Blood After Severe Burns.—In studying sludged blood following severe thermal burns, Brooks and his associates used rabbits and dogs as experimental animals. Observations were also made on burned patients. It was found that there are definite physical alterations in the circulating blood after burns. There is intravascular agglutination of red blood cells into rigid, basic masses. These clumps are usually first seen in the postcapillary venules. White blood cells stick to the vessel walls soon after the burn. Increased plasma viscosity is evidenced by the progressive slowing of the rate at which clumps of red cells turn over as they flow along, by the loss of laminar flow and by the absence of immediate, homogeneous mixing of venous streams as they join. The flow rate decreases to as little as one-third the preburn rate. Reduced rates of flow result in sacculation and tortuosity of vessels and in multiple, small thromboses of small arterioles and venules. This is accompanied with increased anoxia of surrounding tissues. There is leakage of fluid through vessel walls. Red blood cells are present extravascularly, without direct evidence of ruptured vessels. Small hemorrhages occur, and red blood cells have been seen in the phagocytes of spleen, liver and bone marrow after recent burns. The authors discuss mechanisms by which sludging changes following burn may lead to shock. There is no evidence to support the hypothesis that histamine is the "toxin" of burn shock. The evidence presented does not rule ont the possibility that some toxin exists but strongly indicates that physical changes in the circulating blood may be the same as what previously has been called "toxic effect." The extra-

vascular (diapedesis and hemorrhage), intravascular (in "thrombi") and phagocytic loss of red blood cells from the circulating blood which accompanies the sludging changes following burn may be an important factor in postburn anemia. The chemical and/or immunologic factors involved in the initiation of the sludging process and in the depositing of the sticky coating on red blood cells after burn have yet to be determined. The sludging process must be investigated before one can determine a reasonable and adequate treatment for burns.

Prostatic Cancer: Further Investigation of Hormonal Relation.—Brendler and his collaborators describe the clinical and laboratory observations in three patients with advanced prostatic cancer who received testosterone propionate. The dose varied from 25 to 100 mg. daily, and the drug was given for periods up to two months. Two of the three patients had extensive secondary involvement of bone, and one had previously been castrated and had received estrogen. The authors were impressed with the general improvement shown by the two patients with metastatic prostatic cancer while they received testosterone. Pain in the bones was considerably lessened in the patient who complained of this initially and did not develop in either of the other two. As evidenced in roentgenograms, metastasis did not develop in the patient initially free from it, nor did a remarkable change occur in the two patients with metastasis. The serum acid phosphatase showed a further increase in the two patients with osseous metastasis but not in the one without it. Perhaps occult bony metastasis can be diagnosed by observation of the response of the serum acid phosphatase to a short course of androgen injections. Further investigation of the role of androgens in prostatic cancer is warranted. In cases of metastatic cancer of the breast in the female, both androgens and estrogens have been used, androgens apparently exerting a more beneficial effect in younger women and estrogens in the older age group. Androgens appear to affect osseous metastasis predominantly, whereas estrogens primarily influence the soft tissue metastasis and the primary growth itself. Perhaps an analogous situation exists with reference to prostatic cancer.

Carcinoma of the Prostate Gland: Results of Conservative Management.—Reynolds and associates found that conservative management of 104 patients having carcinoma of the prostate gave encouraging results. The patients were seen at frequent intervals and treated with orally administered, enteric-coated diethylstilbestrol. Osseous metastasis was disclosed in 39. Most patients had an advanced neoplasm when first examined. Originally the daily dose was 3 mg. or less. For the past five years, 5 mg. of the drug has been given once daily. Dosage was increased if necessary, and up to 50 mg. was given daily. In some instances the dose was reduced to 2 or 3 mg. daily, after prolonged therapy. The patients who had only slight or no urinary obstruction were treated only with antiandrogenic hormone. In some patients the drug was used in conjunction with indwelling urethral catheter drainage, which was continued for two weeks to four months. Nine patients regained their ability to void; another six patients were unable to void and were subsequently relieved by transurethral resection. This method of managing elderly patients is highly satisfactory because, if the need for transurethral resection becomes evident later, the procedure can be performed when the patient is a better surgical risk than when first seen. Resection was performed in 56 patients. A second resection was required because of regrowth of malignant tissue and subsequent urinary difficulty in 13 patients. Five of these needed a third operation, which made a total of 74 transurethral resections. There was one surgical death. There were two patients in whom thrombophlebitis developed postoperatively and another two patients who had persistent stress incontinence. The authors believe that the patients who had stress incontinence were subjected to a resection that was too radical. The authors subsequently learned to depend more on the antiandrogenic hormone treatment. Of the 104 patients, 81 are alive, 18 are dead and 5 have not been traced. The average survival time of 81 living patients was 34.7 months, for those treated more than one year, 41.1 months. Of the total of 104 patients, 22 survived more than five years, and of these, 16 are still living. The authors conclude that prolonged control of prostatic cancer can be accomplished by the oral administration of antiandrogenic substance.

Bulletin of Johns Hopkins Hospital, Baltimore

87:171-254 (Sept.) 1950

*Studies of Terramycin, in Vivo and in Vitro. E. A. Bliss, P. T. Warth, C. A. Chandler and P. H. Long.—p. 171.
Phosphatase Activity of Cartilage and Periosteum with Various Substrates. R. H. Follis Jr.—p. 181.
Ability of ACTH and Cortisone to Alter Delayed Type Bacterial Hypersensitivity. J. B. Long and C. B. Favour.—p. 186.
Studies of Metabolism of Human Placenta: II. Oxygen Consumption and Anaerobic Glycolysis in Relation to Aging and Severe Toxemia. L. M. Hellman, B. A. Harris Jr. and M. C. Andrews.—p. 203.
Correlation Between Ear Thickness and Saturation Readings of Millikan Oximeter. R. Penneys.—p. 215.
Effect of Posterior Pituitary Extract and Smoking on Water, Sodium and Chloride Excretion in Normal Subjects and in Patients with Congestive Cardiac Failure. B. C. Sinclair-Smith, J. Sisson, A. A. Kattus and others.—p. 221.
Method for Recording Ballistocardiographic Vectors: Preliminary Report. W. R. Scarborough, J. Beser, S. A. Talbot and others.—p. 235.

Studies on Terramycin.—Terramycin is an amphoteric substance forming crystalline hydrochloride and sodium salts; it does not deteriorate during long standing at room temperature at a p_H under 5; it is active in vitro against staphylococci, Bacillus subtilis and a number of gram-negative bacilli. Bliss and her associates found terramycin effective in the control of infections induced in mice with hemolytic streptococci, pneumococci, Klebsiella pneumoniae, Salmonella typhosa and other organisms. Samples of terramycin hydrochloride were tested at the laboratory of the Johns Hopkins University School of Medicine. The sodium salt was compared with the hydrochloride in a few in vitro tests. As there was no difference in the behavior of the two, the sodium salt was not tested in vivo. The authors found that terramycin inhibited the growth of most of the bacteria tested at slightly lower concentrations than aureomycin. Oral administration of a single dose of terramycin hydrochloride to two human subjects resulted in measurable levels of the drug in the blood and urine for at least 24 hours. Terramycin was more effective than aureomycin in the therapy of K. pneumoniae and Hemophilus influenzae infections in mice but was less effective in pneumococcic and hemolytic streptococcic infections.

California Medicine, San Francisco

73:209-302 (Sept.) 1950

*Surgical Treatment of Portal Hypertension. W. P. Longmire Jr.—p. 209.
Use of Aerosol Penicillin and Streptomycin in Bronchopulmonary Infections. J. E. Farber and J. Ross.—p. 214.
Preoperative and Postoperative Care of Acute Arterial Obstruction. N. E. Freeman and R. S. Gilfillan.—p. 218.
Relation of Adrenal Cortex to Immunizing Mechanisms. A. White.—p. 221.
Care of Neglected Burn Patient. G. V. Webster.—p. 225.
*Comparative Concurrent Results of Vagotomy Procedures, Conventional Gastric Resection and Hemigastrectomy with Subtotal Vagotomy. G. A. Stevens, C. S. Kipen and W. L. Ross.—p. 229.
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Cancer of Skin. H. J. Templeton.—p. 256.
Other Malignant Conditions Involving the Skin. N. P. Anderson.—p. 258.

Surgical Treatment of Portal Hypertension.—Longmire performed portacaval shunt operations on 15 of 18 patients who were treated surgically for portal hypertension at the Wadsworth Veterans Hospital. The shunt was established by splenorenal anastomosis in eight of the 15 patients. Two of the eight patients are well; four are considered improved, and two died. The portal vein was anastomosed to the side of the inferior vena cava in the remaining seven patients. Two of these patients are considered improved; one is unimproved, and four died. Total gastrectomy and esophagojejunostomy was performed for hemorrhage on one patient who has had no further bleeding in the three years since the operation. Two patients were treated by splenectomy alone because a satisfactory vein for anastomosis could not be found in the splenic pedicle. One of them showed improvement over a short postoperative period, while the other was unimproved. Of eight patients with intrahepatic block who were subjected to portacaval shunt, four are improved, one is unimproved and three died. Of 10 patients with extra-

hepatic block, six are improved postoperatively, one is unimproved and three died. Survival time of the six patients who died after portacaval shunt varied from three days to four months. Death resulted from thrombosis at the site of anastomosis in two instances, from hepatorenal failure in one, from hepatic failure in one, from extensive pancreatic necrosis in one and from closure of anastomosis in one.

Results of Gastric Resection and Vagotomy in Duodenal Ulcer.—Stevens and co-workers report on 132 patients with duodenal ulcer who were subjected to surgical treatment. The postoperative follow-up period was approximately two years. So-called complete vagotomy, with or without supplemental gastroenterostomy, was performed on 43 patients. Conventional gastric resection was done in 47 patients. Hemigastrectomy and so-called subtotal vagotomy were performed on the remaining 42 patients. Good results were obtained in 33 patients (78 per cent) of the first group, in 42 (90 per cent) of the second group and in 38 (90 per cent) of the third group. Results were unsatisfactory in 10 patients (22 per cent) of the first group, in five (10 per cent) of the second group and in four (10 per cent) of the third group. There were no deaths following gastric resection or hemigastrectomy with subtotal vagotomy. There was one operative fatality from perforation of the esophagus, following vagotomy. Stomal ulcer developed in one patient following gastric resection, in one following hemigastrectomy with subtotal vagotomy and in three following vagotomy and gastroenterostomy. Histamine-induced secretion of gastric acid was greatly reduced after adequate gastric resection and after hemigastrectomy with partial vagotomy, whereas this effect was relatively minimal after vagotomy. There was no instance of gastric retention in patients who had undergone gastric resection and hemigastrectomy or in those who had had partial vagotomy. Of patients subjected to a vagotomy alone, 70 per cent had six to 24-hour retention. The incidence of retention after gastroenterostomy and vagotomy was 17 per cent. Results obtained with gastric resection and with hemigastrectomy with subtotal vagotomy were better than those obtained with vagotomy alone.

Delaware State Medical Journal, Wilmington

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Mental Factors in General Medicine and Surgery. A. W. Gottschall.—p. 202.
Emotional Catharsis, Psychotherapeutic Method for the General Practitioner. G. DeCherney.—p. 208.
Child Guidance at Governor Bacon Health Center: Seizure Control Unit. R. E. Reed.—p. 210.
Psychoses in the Negro: Preliminary Study. S. P. Ivins.—p. 212.
Rationale for In-Patient Treatment of Emotionally Disturbed Children. C. F. Settlage.—p. 213.
Pediatric Activities at the Governor Bacon Health Center. L. Diamond.—p. 216.
Bilateral Prefrontal Lobotomy: Case Report. C. L. R. Souder.—p. 218.
Insulin Therapy: Evaluation of 47 Cases. M. Wiederlight.—p. 220.
Concept of Psychopathic Personality. O. Chardiet.—p. 221.

Endocrinology, Springfield, Ill.

47:75-138 (Aug.) 1950

Role of Estrogen in Estrogen-Relaxin Relationship in Symphyseal Relaxation. R. V. Talmage.—p. 75.
Decrease in Plasma Levels of Endogenous Progesterone During Renal Passage. T. R. Forbes, C. W. Hooker and C. A. Pfeiffer.—p. 83.
Metabolism of Testosterone by Liver Tissue of Niacin, Tryptophan of Thiamine Deficient Rats. M. J. Bryson, L. T. Samuels and H. C. Goldthorpe.—p. 89.
Direct Action of Male Sex Hormone on Adrenal Cortex. L. A. Zizine, M. E. Simpson and H. M. Evans.—p. 97.
Mechanisms of Desoxycorticosterone Action: Effects of Water-Soluble Glycoside on Human Circulatory and Renal Functions. D. M. Green, A. D. Johnson, W. E. Bridges and others.—p. 102.
Utilization of Radioactive Lipides by Normal and Hypophysectomized Rats. R. P. Geyer, J. H. Shaw and R. O. Greep.—p. 108.
Some Effects of Purified Pituitary Growth Hormone on Carbohydrate Metabolism in Rat. A. E. Milman and J. A. Russell.—p. 114.

GP (J. Am. Acad. of Gen. Practice), Kansas City, Mo.

2:31-58 (Sept.) 1950

Common Eye Changes. V. Derrick.—p. 31.
Folic Acid and Vitamin B12 in Anemia. T. D. Spies, F. Milanes and A. Rebordeo.—p. 27.
After Care of the Hemiplegic. D. A. Covalt.—p. 45.
Pollen Injections During Hay Fever Season. G. L. Waldbott.—p. 49.
Hyperventilation Syndrome. O. B. Hull.—p. 53.

Illinois Medical Journal, Chicago

98:161-216 (Sept.) 1950

Convalescent Poliomyelitis. R. L. Bennett.—p. 174.
Public Health Aspects of Infantile Paralysis. E. A. Piszczek.—p. 179.
*Problems in Differential Diagnosis of Poliomyelitis. H. M. Woodcock, G. M. Cline and J. B. Richmond.—p. 183.
Poliomyelitis: Clinical Pathological Correlation. M. Appel.—p. 190.
Penicillin in Treatment of Congenital Syphilis. N. G. Shaw.—p. 193.
Protruding Ears: Correction by Plastic Surgery. O. J. Becker.—p. 196.
Sections vs. Smears in Study of Bone Marrow. M. Block.—p. 202.
Pitfalls in Colon Surgery. R. W. McNealy and F. D. Wolfe.—p. 205.

Differential Diagnosis of Poliomyelitis.—According to Woodcock and his co-workers early diagnosis in poliomyelitis has prompted physicians to "err on the side of safety" by diagnosing poliomyelitis when suggestive symptoms occur. They present data accumulated during the summer and fall of 1949 in a diagnostic and treatment center for poliomyelitis. A total of 140 patients referred by physicians were admitted with a tentative diagnosis of poliomyelitis. Of these, 110 (78.5 per cent) were found to have poliomyelitis. Almost any child with a gait disturbance or loss of function of an extremity was suspected of having poliomyelitis. The following manifestations should suggest that other diagnoses be considered: (1) severe pain, localized tenderness, or swelling of affected extremities, (2) pronounced lymphadenitis or lymph node enlargement, (3) fever, particularly of a septic nature, (4) a critically ill, irrational or comatose state, (5) dehydration, (6) convulsions, (7) prolonged illness with subsequent paralysis and regional sensory changes, (8) upper motor neurone lesions and (9) ataxia. The authors list 58 entities that have been confused with poliomyelitis. These included mastoiditis, pneumonia, mumps, rheumatic fever, osteomyelitis, torticollis, retropharyngeal, cervical or brain abscesses, epilepsy, herpes zoster, cerebral malaria, encephalitis resulting from vaccination, postdiphtheritic neuritis, multiple sclerosis, transverse myelitis, various forms of meningitis, infectious polyneuritis and Coxsackie virus infections. The hazards of exposing children in whom the diagnosis is unconfirmed necessitate adequate isolation facilities pending the establishment of a definitive diagnosis in any center caring for patients with poliomyelitis.

Industrial Medicine and Surgery, Chicago

19:397-452 (Sept.) 1950. **Partial Index**

Experience of General Motors in Developing New Techniques for Selection, Placement and Follow-Up of Employees: Panel Discussion. G. A. Jacoby.—p. 397.
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Employment Testing. O. L. Crissey.—p. 403.
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Antihistamine Chemicals in Treatment of Common Cold: Report on a Twenty-Seven Month Study. W. L. Baughn.—p. 413.
Accident Proneness: A Serious Industrial Problem: What Can the Industrial Physician Do About It? E. Wolff.—p. 419.
Present Position and Future of British Industrial Medicine. A. R. Thompson.—p. 433.
*Relationship Between Truck and Tractor Driving and Disorders of the Spine and Supporting Structures. W. I. Fishbein and L. C. Salter.—p. 444.

Truck and Tractor Driving and Disorders of the Spine.—The survey on which Fishbein and Salter base this report was undertaken to throw light on the relationship between disorders of the spine and supporting structures and the driving of trucks and tractors. A questionnaire, so worded as to avoid specific reference to the seating factor, was sent to all the orthopedic surgeons in the United States. To the 1,474 questionnaires mailed out, replies were received from 378, or about one fourth. The widespread interest in the subject is indicated by the fact that 327 requested a copy of the report. Question 3 read: "Which of the following disorders do you believe may have been caused in whole or in part by driving trucks or tractors?" The dis-

orders listed and the number of positive answers were as follows: spinal injuries 25, herniated disks 95, osteoarthritis 103, spondylitis 41, subluxation 20, sacroiliac strain 72, traumatic fibrositis 109 and coccygodynia 82. Thirty-seven disorders in addition to those listed were named in the replies. These included lumbosacral strain, pilonidal sinus or cyst, sciatic neuritis, low back pain, lumbosacral arthritis, fibrositis, myositis and mechanical backache. These authors feel that, with more than 10,000,000 trucks and tractors being operated in the United States, exclusive of those in the Armed Forces, the health hazards of driving such vehicles constitute a major medical problem that have not received the attention and study they deserve either by the medical profession or the manufacturers of such equipment.

Iowa State Medical Society Journal, Des Moines

40:389-434 (Aug.) 1950

Allergy in General Practice of Medicine. J. H. Black.—p. 389.
Nasal Allergy. G. W. Bates.—p. 392.
Status of Antihistaminic Therapy. G. F. Harkness.—p. 395.
Tonsillectomy and Poliomyelitis—Southwestern Iowa, 1948-1949. J. V. Treynor.—p. 400.

40:435-470 (Sept.) 1950

Gallbladder and Common Duct Problem as Seen by General Practitioner and General Surgeon. R. L. Sandera.—p. 435.
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Some Causes and Treatment of Epistaxis. W. R. Lee.—p. 446.
Physician Views State Vocational Rehabilitation Division. A. S. Price.—p. 449.
The Tumor Clinic and the Physician. E. G. Zimmerer.—p. 450.

Journal of Applied Physiology, Washington, D. C.

3:1-54 (July) 1950

Electrocardiography and Cardiac Physiology. J. S. Robb.—p. 1.
Device for Continuous Recording of Concentration of Evans Blue Dye in Whole Blood and Its Application to Determination of Cardiac Output. A. Friedlich, R. Heimbecker and R. J. Bing.—p. 12.
Human Heat Production in Relation to Body Weight and Body Surface: III. Inapplicability of Surface Law on Fat Men of Tropical Zone. IV. General Interpretation of Climatic Influence on Metabolism. P. Enéas Galvão.—p. 21.
Influence of Antihistaminics on Respiratory Response to Hypoxia. W. L. Burkhardt, B. R. Eastman and H. B. Hale.—p. 29.
Measurement of Pathological Pain in Distinction to Experimental Pain. A. S. Keats, H. K. Beecher and F. C. Mosteller.—p. 35.
Value of Different Test Foods in Estimating Masticatory Ability. A. Yurkstas and R. S. Manly.—p. 45.

Journal of Bacteriology, Baltimore

60:107-214 (Aug.) 1950. **Partial Index**

Relationship of Biotin to Coenzyme of Certain Amino Acid Deaminases. J. F. Christman and H. C. Lichstein.—p. 107.
Oxidative Assimilation of Glucose by Escherichia Coli. B. V. Siegel and C. E. Clifton.—p. 113.
Artifacts, with Other Nonspecific Appearances Resembling Virus Particles, and So-Called Filamentous Forms of Influenza and Fowl Pest Viruses in Human Skin Tissue Fluid Examined with Electron Microscope. J. J. Angulo, J. H. L. Watson and J. Olarte.—p. 129.
Effects of Aureomycin and of Penicillin Against Erysipelothrix Rhusiopathiae In Vitro and In Vivo. J. E. Prier and J. O. Alberts.—p. 139.
Evaluation of Oral, Intravenous and Intramuscular Aureomycin and Correlation Between in Vivo and in Vitro Activity. M. Klein, S. E. Schorr, S. Tashman and A. D. Hunt Jr.—p. 159.
Effect of Heparin on Growth of Bacteria and Yeasts. J. R. Warren and F. Graham.—p. 171.
Investigations of Fecal Bacteria of Mice, with Reference to Presence of Mouse Encephalomyelitis Virus. M. Shaw and G. Dalldorf.—p. 175.
Production of Acetate from Fatty Acids by Neurospora. J. Lein and P. S. Lein.—p. 185.

Journal of Experimental Medicine, New York

92:191-298 (Sept.) 1950

Role of Non-Precipitating Antibodies in Passive Sensitization of Human Skin by Rabbit Anti-Ovalbumin. W. B. Sherman, A. E. O. Menzel and P. M. Seebohm.—p. 191.
Crystallization and Serological Differentiation of Streptococci Proteinase and Its Precursor. S. D. Elliott.—p. 201.
Purification and Properties of Streptolysin S. B. Cinader and L. Pillemer.—p. 219.
Studies on Life Cycle of Spirochetes. E. D. DeLamater, R. H. Wiggall and M. Haanes.—p. 239.
Studies on Acute Disseminated Encephalomyelitis Produced Experimentally in Rhesus Monkeys: V. Complement-Fixing Antibodies. C. E. Lumsden, E. A. Kabat, A. Wolf and A. E. Bezer.—p. 253.
Studies on Agent of Infectious Hepatitis. W. Henle, S. Harris, G. Henle and others.—p. 271.

Journal of Nervous and Mental Disease, New York

112:187-280 (Sept.) 1950

Studies in Epilepsy: Significance of "Spontaneous" Abnormalities in Brain Wave Patterns as Observed During Interview with Epileptic Patients. W. Barker, S. Burgwin and D. J. Simons.—p. 187.
Mild Manic-Depressive Psychosis, Depressive Type: Psychiatric and Clinical Significance. J. D. Campbell.—p. 206.
Remission as Feature in Torulosis. H. N. Willard and H. G. Wolff.—p. 237.
Amnesia for Left Limbs and Loss of Interest and Attention in Left Fields of Vision. K. E. Frantz.—p. 240.
*Sodium Amytal as Causative Factor in Some Cases of Prolonged Insulin Coma. R. B. White, R. M. Gilliland and J. R. Ewalt.—p. 245.

Amobarbital Sodium and Prolonged Insulin Coma.—White and his collaborators say that patients in whom subshock or shock has been produced by insulin may require some rapidly acting hypnotic for sedation or for facilitation of therapeutic interviews. Because amobarbital (amytal®) sodium is commonly used for these purposes, they call attention to possible dangers associated with the combined use of these two drugs. They cite three patients of their own and a patient reported by Kalichman in 1948 in whom a critical condition developed when amobarbital sodium was given shortly after insulin shock. The first patient remained in a critical condition for 24 hours. He showed the usual signs of prolonged coma, including hyperpyrexia, repeated clonic spasms and stertorous breathing. Two patients had signs of prolonged coma until the third and fifth postcoma days. The authors suggest the following possible explanations of the difficulties observed: (1) masking of the signs of hypoglycemia by the amobarbital sodium, (2) insufficient precaution and care by the staff and (3) possible dangerous synergism between amobarbital sodium and insulin. Evidence implicates the barbiturates as a contributing agent in increasing the likelihood of prolonged coma when insulin and barbiturates are used simultaneously. The authors recommend increased caution in the simultaneous use of these two drugs.

Journal of Urology, Baltimore

64:441-540 (Sept.) 1950

Not By Medicine Alone. C. Rusche.—p. 441.
Focal Pyelonephritis: Case of Severe Hematuria. H. C. Harlin, L. N. Foster and C. P. Armstrong.—p. 445.
Congenital Unilateral Ectopic Kidney: Report of Two Cases. C. J. Hawes.—p. 453.
Ureteral Implantation: I. Experiments on Surgical Principles Involved in Open Submucosal Method of Ureteral-Intestinal Anastomosis. F. Hinman Jr. and F. Hinman.—p. 457.
*Diagnosis of Bladder Tumor. N. E. Berry and J. D. Hamilton.—p. 464.
Treatment of Infiltrating Carcinoma of Bladder by "Retrograde Method of Interstitial Radiation." T. B. Wayman.—p. 469.
Diagnostic Value of Lacunar Cystography. E. Perez Castro.—p. 484.
Adenocarcinoma of Urachus Involving Bladder and Abdominal Wall. M. J. Loeb.—p. 499.
Mucinous Adenocarcinoma Arising in Urachal Cyst and Involving Bladder. C. G. Bandler and P. R. Roen.—p. 504.
Leiomyoma of Prostate: Report of Case. C. P. Gray and G. J. Thompson.—p. 511.
Polyorchidism: Case Report. P. G. Smith, A. T. Evans and G. L. Suder.—p. 515.
Feminizing Testis Tumors. L. G. Lewis and C. G. Stockard.—p. 518.
Massive Hematocele Threatening Life by Exsanguination. J. S. Cowdery, E. S. Gault and K. B. Conger.—p. 524.
Concomitant Medical Conditions in Urologic Surgery. N. O. Brink and C. H. Peters.—p. 529.
Simple Rotatable Electrotome. J. J. Nugent.—p. 534.
Cutaneous Bridges for Skin Ureterostomy Retention Catheters. S. Carleton and G. Nagamatsu.—p. 537.

Diagnosis of Bladder Tumor.—Berry and Hamilton say that, in cancer of the bladder, the exact nature and extent of a lesion must be determined before operation. They agree with Milner that a biopsy specimen obtained by the resectoscope, properly taken and correctly prepared, gives accurate information on bladder tumors and compares favorably with those taken at operation. The taking of a biopsy specimen should be carefully planned and meticulously carried out. One piece of tissue is rarely enough. Sections should be taken to show not only the papillary portion of a tumor but its base and, in some cases, the surrounding tissue as well. The tissue fragments must be sectioned so that the mucosal surface, submucosa and muscle are shown. The surface to be cut is painted with merbromin, which is applied with a swab. The merbromin is not removed by fixation and dehydration and does not interfere with staining of the sections. If the surgeon does not

mark the surface to be cut, then he must show the pathologist how the specimen should be embedded, because, in many cases, if the biopsy is small, it is impossible to tell one surface from another after fixation in formalin. Accurate preoperative diagnosis of tumors of the bladder is possible in almost every case with the information obtained by cystoscopic examination, resectoscope biopsy and bimanual examination.

J. Venereal Disease Information, Washington, D. C.

31:225-250 (Sept.) 1950

Measurement of Trend of Syphilis in Mississippi. A. L. Gray, L. J. Usilton and A. P. Iskrant.—p. 225.
Ohio National Guard Blood-Testing Program. C. R. Freeble Jr., E. O. Wright, J. F. Donohue and J. B. Bolin.—p. 231.
*Treatment of Early Syphilis with Three Injections of Penicillin and with One Injection of Penicillin. II. R. D. Wright, F. P. Nicholson and R. C. Arnold.—p. 235.

Treatment of Early Syphilis.—Wright and his co-workers report on studies undertaken at the Venereal Disease Research Laboratory to determine the results of administration of varying amounts of procaine penicillin G. Average penicillin levels of patients recently treated with one-injection and three-injection schedules are presented. Post-treatment observations for more than a year prove that a single injection of 300,000 units of procaine penicillin G in peanut oil containing 2 per cent of aluminum monostearate does not provide an optimum cure rate in early syphilis. The schedule of 600,000 units daily for three days offers an effective regimen for the ambulatory treatment of early syphilis.

Michigan State Medical Society Journal, Lansing

49:881-1008 (Aug.) 1950

Manipulative Treatment of Low Back Pain. H. J. Schaubel.—p. 913.
Physical Medicine and Rehabilitation in Management of Hemiplegia in Adult. M. K. Newman and L. Cohen.—p. 917.
Occupational Therapy in Physical Medicine. B. Jewett and M. K. Newman.—p. 923.
Disruption of Vaginal Wound with Evisceration: Eighteen Months Following Vaginal Hysterectomy. C. E. Dunn.—p. 925.
General Practitioner Visits National Health Doctor. R. E. Clark.—p. 928.
Teratoma of Ovary in Child. C. D. Benson and H. E. Fulton.—p. 932.
The Duodenal Stump. W. W. MacGregor.—p. 935.
Multiple Sclerosis. G. Steiner.—p. 938.

Military Surgeon, Washington, D. C.

107:89-170 (Aug.) 1950. **Partial Index**

Blood Transfusion Experience of the Veterans Administration, July 1, 1948-July 1, 1949. G. R. Callender and R. T. York.—p. 89.
Procedure in Clinical Research. C. C. Shaw and A. P. Webster.—p. 92.
Tuberculosis Control Program of the U. S. Veterans Administration. L. V. Schneider.—p. 97.
*Poliomyelitis—An Hypothesis of Its Etiology. J. G. Cumming.—p. 102.
Recent Trends in Prostatic Surgery. A. J. Leader.—p. 108.
Polyphasic Surgery. W. P. Kleitsch.—p. 117.
Tests to Determine Suitability of Burnt Coral as a Dentifrice. M. G. Wheatcroft, C. A. Schlack and B. L. Taylor.—p. 122.
Ano-Rectal Fibrosis. N. B. Jaffe.—p. 129.
Evaluation of Oral Priscoline as an Antipruritic Agent. L. Wirth.—p. 131.

107:175-260 (Sept.) 1950. **Partial Index**

Etiology, Symptomatology, and Therapy of Aphthous Stomatitis. V. H. Dietz.—p. 175.
Minor Hemorrhages of Late Pregnancy. F. B. Smith.—p. 185.
Preventive Medicine in Austria: A Post War Report. P. R. Beckjord.—p. 190.
Toxic Hepatitis Presumably Produced by Massive Prolonged Ingestion of Atabrine: Case Report with Autopsy Findings. W. L. Craddock.—p. 199.
Tantalum Gauze Hernioplasty. W. P. Kleitsch.—p. 201.
Tularemia: Ulcero-Glandular Type with Pneumonia. D. H. Koonce.—p. 204.

Poliomyelitis: Hypothesis of Its Etiology.—Cumming presents evidence that poliomyelitis is the result of a carrier state and of autoinoculation of nerve tissue through a wound. He points out similarities between rabies and poliomyelitis. First, both are neurotropic; second, for the disease to occur, there must be disruption or severing of nerve fibers, and the virus of the saliva-rabid animal or poliomyelitis carrier must have sufficient concentration to make direct contact with the axon protoplasm of the disrupted nerve fibers; third, the pathological process of both is limited to the central nervous system; fourth, occurrence of the disease is rare in proportion to the number of wound exposures, and, fifth, there is no generalized inflammatory involvement at the portal of entry in either disease. Rabies virus is strictly neurotropic, since it has no phase of multiplication except in nerve tissue. It must be transmitted from nerve tissue to nerve tissue, with only a brief passive salivary phase. Poliomyelitis virus, on the other hand, has an extraneural multiplication or growth phase. It is found in the oropharynx, along the intestinal canal and in alvine discharges. Hence, it is propagated by dissemination of the virus from person to person by direct and indirect contact. In a poliomyelitis outbreak in 1945, 59 patients were studied with regard to oral and surface injuries. Twenty-one had a history of oral injuries and 33 of surface injuries within four weeks of the onset of symptoms—a 92 per cent injury rate. The control of poliomyelitis involves first the prevention of the spread of virus from person to person. This requires the same measures of personal hygiene and sanitation which are applicable to the common contact infections. Cleansing of accidental wounds, which serve as portals of entry to severed nerve fibers, is the second important factor in prevention of the autoinoculation of the virus of poliomyelitis.

Minnesota Medicine, St. Paul

33:857-960 (Sept.) 1950

Medical Practice on Level Four. F. J. Elias.—p. 877.
Surgical Treatment of Mitral Heart Disease. I. D. Baronofsky and J. F. Briggs.—p. 881.
Significance of Isolated Pulmonary Nodule. D. V. Sharp and T. J. Kinsella.—p. 886.
Clinical Detection of Pulmonary Emphysema from Respiratory Tracings. P. H. Soucheray.—p. 889.
Respiratory Allergies in Children. L. S. Nelson and A. V. Stoesser.—p. 893.
Cancer of Large Bowel. H. Fisketti.—p. 897.
*Berylliosis: Brief Discussion and Presentation of Case with Pulmonary, Digital and Axillary Node Involvement. R. A. Nachtwey, M. B. Dockerty and C. H. Hodgson.—p. 904.
Benign Tumors, Nevi and Precanceroses. C. W. Laymon.—p. 908.

Berylliosis.—Nachtwey and his associates summarize the present status of knowledge on berylliosis and report a man, aged 35, who was in the electrical business and who had worked with fluorescent lamps, blowing the glass and coating the tubes. He had a nonproductive cough for many years. During the fall of 1948 he noticed dyspnea on exertion and fatigue. He also had bilateral thoracic pain of pleuritic nature. For several months before coming to the Mayo Clinic he had noticed slight edema of the ankles. Diuretics had been administered at home without appreciable effect on the edema. Examination revealed persistent fine rales over the lower two thirds of both lung fields. At the base of the nail on the left fourth finger there was a healed scar, which the patient said was the result of a lesion which would occasionally swell, drain and then heal over. He thought this lesion had followed a cut by a piece of fluorescent glass. An abnormally enlarged lymph node was found in the left axillary space. This node was removed in April 1949. Microscopic examination revealed that it was a granuloma, and spectrographic analysis disclosed beryllium. The patient was advised to avoid all contact with beryllium powder or fumes and to avoid overexertion. The authors stress that, because berylliosis is an uncommon disorder, its presence is not likely to be suspected. Failure to recognize the cause of the trouble and failure to remove the patient from further exposure may result in irreparable damage to his health or cause his death.

Nebraska State Medical Journal, Lincoln

35:273-304 (Sept.) 1950

Functional Disturbances Encountered in Gynecic Practice. W. R. Cooke.—p. 275.
Fractures Treated Conservatively. W. R. Hamsa and L. S. Campbell.—p. 282.
The Dentists' Viewpoint. W. P. Higgins.—p. 285.
Lumbar Sympathectomy (Report of Fifty-Five Cases from Kansas City General Hospital). G. N. Johnson and F. I. Wilson.—p. 286.
*Preliminary Report on Use of Terramycin in Pneumonia. P. T. Pratt.—p. 294.

Terramycin in Pneumonia.—Pratt reports a Negro woman, aged 27, in her sixth month of pregnancy. Radiologic examination revealed an irregular area of consolidation in the lower lobe of the left lung. This appeared to be segmental pneumonia, involving the medial portion of the left lower lobe. The patient

was given 500 mg. of terramycin hydrochloride orally every six hours, starting at 5 p. m. on April 25, 1950. She was given nasal oxygen throughout the night and 1 grain (60 mg.) of codeine phosphate every four hours for chest pain. The next morning her temperature dropped to 98.2 F., the pulse rate was 100, respirations 26 and the fetal heart rate 136. The chest pain was nearly gone. The cough was decreased and the sputum no longer blood tinged. The condition of the chest was unchanged. The patient stated that she felt well. The oxygen and the codeine were discontinued and were not used throughout the remainder of the hospital stay. Roentgen examination of the chest on April 27, 1950, revealed no significant change, but definite clearing of the area of consolidation was seen on May 1, 1950. The patient was discharged on May 3, 1950, as clinically well. Terramycin is apparently as effective as streptomycin and does not have the serious side effects.

New England Journal of Medicine, Boston

243:281-324 (Aug. 24) 1950

Adenoma of Islands of Langerhans: Its Differentiation from Functional Hypoglycemia. H. A. Perkins, J. F. Desforges and C. G. Guttas. —p. 281.
Management of Simple Fracture of Clavicle in Adults. T. B. Quigley. —p. 286.
Thromboangiitis Obliterans in Woman: Possible Relation to Rheumatic Disease. E. A. Edwards.—p. 290.
Hypertension. D. Loofbourow and R. S. Palmer.—p. 295.

243:325-356 (Aug. 31) 1950

*Renal Changes in Gout. J. Brown and G. K. Mallory.—p. 325.
Pleural-Fluid Eosinophilia. F. G. MacMurray, S. Katz and H. J. Zimmerman.—p. 330.
*Plasmacytoma of Lymph Node: Report of Case with Multiple Myeloma. M. A. Simon and S. Eidlow.—p. 335.
Cardiac Catheterization. L. B. Ellis and R. A. Bloomfield.—p. 339.

Renal Changes in Gout.—Brown and Mallory report pathological changes in the kidneys revealed by necropsy in five proved cases and one unproved case of gout. All kidneys showed significant or pronounced benign nephrosclerosis and deposits of urates in the medulla, probably originally in the collecting tubules. These observations conform to those of previous studies. Renal lesions presumably specific for gout were observed in one case, but no definite history of acute arthritis was obtained and no tophi or joint lesions were observed at necropsy. This case may have been one of "primary renal gout." Extensive chronic pyelonephritis was revealed by necropsy in two of the six cases; small focal areas of healed pyelonephritis were observed in one case, and observations in another case were suggestive of pyelonephritis. There was frequent association between tubules blocked by urates in the medulla and abscesses nearby or pyelonephritis in the cortex above. It is suggested that tubular blockage by urates predisposes to pyelonephritis, which may contribute to the renal damage commonly observed in gout.

Plasmacytoma of Lymph Node.—Simon and Eidlow report a man aged 52 with a painless swelling in the right inguinal region of four weeks' duration. A well demarcated lymph node was removed under local anesthesia. Biopsy revealed a plasmacytoma of the lymph node. Roentgenograms of the ribs, long bones and skull failed to reveal any pathological change. The urine showed no Bence-Jones protein, but bone marrow and blood protein studies were not done. The patient received irradiation to the right inguinal and iliac regions. One year later he was seen again because of slight recurrent swelling in the right inguinal region, but permission for another biopsy was refused and the patient was not seen for two years. When seen again he had signs of multiple myeloma. Bence-Jones bodies were demonstrated in the urine. Roentgenograms revealed pathological fractures of the ninth and tenth ribs, with many vacuolated and honeycombed areas of rarefaction in the left humerus and in the left scapula. The patient died 47 months after the lymph node biopsy. It is possible that the disease originated in the lymph node and later spread, but it is equally possible that the bone marrow was involved at the time of lymph node biopsy without roentgen evidence of bone destruction. Plasmacytoma in lymph nodes carries a grave prognostic significance and is usually followed, after varying periods, by clinically manifest multiple myeloma.

New York State Journal of Medicine, New York

50:1983-2094 (Sept. 1) 1950

Value of Proctoscopy as Routine Examination in Preventing Deaths from Cancer of Large Bowel. C. J. Miller, E. Day and E. S. L'Esperance. —p. 2023.
*Cholinergic and Anticholinergic Drugs and Their Trial in Treatment of Gastrointestinal Disorders: Trial of Urecholine and Banthine. K. S. Grimson.—p. 2028.
Incidence of Amebiasis in Albany (New York) Area. R. C. Towse, D. A. Berberian and E. W. Dennis.—p. 2035.
Diarrheal Diseases—New Specialty. W. Z. Fradkin.—p. 2040.
Acute Pancreatitis: Further Observations of Value in Its Recognition. W. F. Lipp and A. H. Aaron.—p. 2043.
Therapeutic Trends and Management in Advanced Carcinoma of Colon and Rectum. M. R. Deddish.—p. 2047.
Newer Concept in Management of Chronic Ulcerative Colitis. J. J. Stefano.—p. 2050.
*Chloromycetin Therapy in Chronic Ulcerative Colitis. Z. T. Bercovitz. —p. 2057.
Rehabilitation of Lower Extremity Amputee in Large General Hospital. W. M. Schultz.—p. 2061.
Experimental Study of Synthetic Breast Milk for Infant Feeding Formula. H. R. Litchfield, R. Norton and C. Hoffman.—p. 2067.

Cholinergic and Anticholinergic Drugs.—According to Grimson, drugs which stimulate the cholinergic pathways of the parasympathetic nerve supply to the gastrointestinal tract (cholinergic agents) and drugs which block these pathways (anticholinergic agents) are useful in treatment of functional disorders or diseases. The urethane derivative of beta-methylcholine chloride (urecholine®), given in doses of 2.5 mg. subcutaneously at four hour intervals, or 30 mg. by mouth taken on arising and 15 or 29 mg. midmorning and midafternoon, for prolonged periods up to two or more years proved most effective and aided treatment of megacolon, diabetic neuropathy with abnormal intestinal function, postvagotomy disturbances, abdominal distention or ileus and urinary retention following pelvic surgery or chordotomy. Beta-diethylaminoethyl xanthene-9-carboxylate methobromide (banthine®), given in doses of 100 mg. by mouth or 10 mg. subcutaneously or intramuscularly, proved most effective and aided treatment of peptic ulcer and to some extent several disorders or diseases of the small bowel and colon. Urecholine® is an effective agent for treatment of gastrointestinal disorders associated with diminished motor activity, and banthine® is an effective agent for treatment of disorders which, like peptic ulcer, are associated with excessive motor activity.

Chloramphenicol in Ulcerative Colitis.—Bercovitz treated 24 patients with chronic ulcerative colitis with chloramphenicol (chloromycetin®). Three grams daily were observed to be the most effective dosage. Thirteen patients showed pronounced improvement during the first month of observation. There was a prompt and often dramatic decline in the number of bowel movements, with normally formed stools, no blood or mucus, good sphincter control, no night movements and no abdominal discomfort. From a clinical standpoint these 13 patients became essentially normal. Sigmoidoscopy revealed that the mucosa was normal, and submucous petechiae were not observed. Three patients were moderately improved. Eight patients did not show essential change. Though initially they responded in mild degree to the drug, this response was usually only temporary, and in no instance was it comparable to that of the first group. Chloramphenicol therapy proved of definite value also in subsequent relapses. The prompt administration of the drug prevented the usual decline associated with a tendency to relapse and often resulted in rapid response. No patient relapsed to the level of the original severity of the disease. Chloramphenicol may be used repeatedly and for prolonged periods without toxic side-reactions. After the initial period of treatment for about one month, an interrupted schedule of treatment for relatively short periods proved superior to constant and prolonged administration. The patients continued to be improved, both symptomatically and sigmoidoscopically, for extended periods after administration of the drug was discontinued. Final clinical evaluation can be made only after a period of about five years, when sufficient time has elapsed to account for spontaneous remissions, seasonal variations, psychoemotional situations and other conditions which may influence ulcerative cholitis.

Ohio State Medical Journal, Columbus

46:845-940 (Sept.) 1950

Bronchoscopy in the Newborn. C. C. R. Jackson.—p. 869.
Preliminary Report on "At Birth" Diphtheria, Pertussis and Tetanus Immunization. H. D. Chamberlain and R. E. Bullock.—p. 875.
Recent Concepts in Study of Infertility. H. D. Clapp and D. R. Weir. —p. 877.
Case Report: Eclampsia in Fourteen-Year-Old Negress with 252 Recorded Convulsions. E. Eichner and L. P. Mallin.—p. 882.
Unusual Ovarian Cyst Developing Post Partum: Case Report. M. E. Black.—p. 884.
Advantages of Ocular Implants in Enucleation Surgery. D. E. Rolf. —p. 886.
Case of Splenic Neutropenia Complicated by Infectious Mononucleosis After Splenectomy. C. I. Wyler and E. H. Sterne Jr.—p. 888.

Philippine Medical Association Journal, Manila

26:243-270 (June) 1950. **Partial Index**

Total Pneumonectomy: Report of Successful Case. A. I. Reyes.—p. 243.
Paragonimiasis: Report of Three Cases with Pulmonary and Neurological Symptoms. D. M. Garduño and D. Carpio.—p. 253.
First Aid Management of Some Ocular Emergencies. G. de Ocampo and V. Villadolid.—p. 261.
Blood Banking. R. Y. Atienza.—p. 267.

Postgraduate Medicine, Minneapolis

8:155-250 (Sept.) 1950

Progress in Anesthesiology. E. B. Tuohy.—p. 156.
Hypersensitive Carotid Sinus. J. R. Veal and R. Bauerfeld.—p. 160.
Common Problems in Coronary Artery Disease. S. N. Jones and T. F. Keliher.—p. 172.
Carcinoma of Upper Rectum and Rectosigmoid: Clinical Report on High Inferior Mesenteric Ligation. G. W. Ault, A. F. Castro and R. S. Smith.—p. 176.
Practical Applications of Bacteriologic Studies in Diagnosis of Infectious Diseases. S. Saslaw.—p. 184.
Diagnosis and Treatment of Acute Pancreatic Disease. R. J. Coffey, E. B. Barnes, P. Reed and F. B. Brandt.—p. 191.
Some Problems Presented by Cranial Defects. O. H. Fulcher and A. A. Morris.—p. 198.
Splenectomy in Leukemia. O. B. Hunter and P. C. Kiernan.—p. 207.
Meckel's Diverticulum as Source of Massive Intestinal Hemorrhage. F. R. Sanderson and F. A. Barrett Jr.—p. 214.
Pulmonary Function Studies in Surgery. J. J. Curry and F. S. Ashburn. —p. 220.
Polyps of Large Bowel. C. E. McNamara.—p. 225.
Modern Treatment of Rheumatoid Arthritis. D. C. Crain, L. H. Kyle and M. Rubin.—p. 228.
*Hemophilia Simulating Acute Surgical Abdomen. M. Shelton and H. H. Hussey.—p. 233.

Hemophilia Simulating Acute Abdominal Conditions.—Shelton and Hussey point out that the bleeding of hemophilia is in the deep structures, muscles, bones and joints. This may help to distinguish hemophilia from other hemorrhagic diseases, such as thrombopenic purpura, in which blood often oozes from the mucous membranes. Intra-abdominal hemorrhage is one of the most serious forms of bleeding in hemophilia. There may be hemorrhages into the wall of the colon or the mesocolon, where the signs are those of partial obstruction, and into the iliopsoas muscle, where the signs resemble those of acute appendicitis. The authors describe two cases which exemplify the difficulties that may be encountered when a hemophilic patient complains of pain in the lower part of the abdomen. At the time of their admission both patients were known to have hemophilia. It was not known if their symptoms were due to a bleeding episode or to acute appendicitis. In the first case, intestinal hemorrhage seemed most probable, because of the tarry stools and coffee ground vomitus and signs of generalized peritoneal irritation. The treatment was directed to correction of the coagulation defect, and the rapid regression of symptoms substantiated the impression that intra-abdominal hemorrhage was the sole cause. In the second case, the condition progressed so rapidly that surgical intervention appeared imperative. The patient was prepared with antihemophilia globulin, and the abdomen was explored as soon as the coagulation time approached normal. Intra-abdominal hemorrhage was found, although the clinical symptoms were those of acute appendicitis. Criteria for the diagnosis of hemophilia include a familial and personal history of bleeding, increase in clotting time of venous blood and return of the clotting time to normal after administration of antihemophilic globulin. During an acute episode of bleeding, local measures include application of cold to the area, pressure bandages, fibrin foam, thrombin, electrocautery, gelatin, epinephrine, muscle or placental extracts and application of globulin. If the hemorrhage is not controlled by local measures, or if there is internal bleeding, general therapy should be instituted. Transfusion of 500 cc. of whole blood usually corrects the coagulation defect. A transfusion of 200 mg. of antihemophilic globulin fraction I, dissolved in 5 to 10 cc. of isotonic sodium chloride solution is as effective as whole blood, if there is no anemia.

Proc. Staff. Meet. Mayo Clinic, Rochester, Minn.

25:473-504 (Aug. 16) 1950

SYMPOSIUM ON CORTISONE AND ACTH IN CLINICAL MEDICINE

Introduction: Cortisone and ACTH in Clinical Medicine. P. S. Hench. —p. 474.
Effects of Cortisone and ACTH on Patients with Rheumatoid Arthritis. C. H. Slocumb, H. F. Polley, P. S. Hench and E. C. Kendall.—p. 476.
Effects of Cortisone and ACTH in 14 Patients with Acute Rheumatic Fever. A. R. Barnes.—p. 478.
Effects of Cortisone on Acute Disseminated Lupus Erythematosus. L. A. Brunsting, C. H. Slocumb and J. W. Didcot.—p. 479.
Effects of Cortisone on Bronchial Asthma and Hay Fever Occurring in Subjects Sensitive to Ragweed Pollen. H. M. Carryer, G. A. Koelsche, L. E. Prickman and others.—p. 482.
Experience with Cortisone and ACTH in Chronic Ulcerative Colitis. W. H. Dearing and P. W. Brown.—p. 486.
Cortisone and ACTH in Management of Leukemia and Lymphoblastoma. J. M. Stickney, F. J. Heck and C. H. Watkins.—p. 488.
Effects of Cortisone on Certain Ophthalmic Diseases. J. W. Henderson and R. W. Hollenhorst.—p. 490.
Action of Cortisone in Nephritis with Edema. N. M. Keith, M. H. Power and G. W. Daugherty.—p. 491.
Effects of Cortisone and ACTH on Periarteritis Nodosa and Cranial Arteritis. R. M. Shick, A. H. Baggenstoss, B. F. Fuller and H. F. Polley.—p. 492.
Use of Cortisone and ACTH in Certain Diseases: Psychiatric Aspects. H. P. Rome and F. J. Braceland.—p. 495.
Effects of Cortisone and ACTH in Certain Endocrine Conditions. R. M. Salassa.—p. 497.
Cortisone in Neurologic Disease. C. H. Millikan and L. M. Eaton. —p. 499.
Summary: Cortisone and ACTH in Clinical Medicine. R. G. Sprague. —p. 500.

Psychoanalytic Quarterly, Albany, N. Y.

19:295-454 (July) 1950. **Partial Index**

Prepuberty Trauma in Girls. P. Greenacre.—p. 298.
Mucous Colitis Associated with Phobias. M. Sperling.—p. 318.
Obsessive-Compulsive Symptoms in Incipient Schizophrenic. W. L. Pious. —p. 327.
Application of Psychoanalytic Concepts to Social Science. H. Hartmann. —p. 385.
*Unsatisfactory Results of Psychoanalytic Therapy. C. P. Oberndorf. —p. 393.
Repression as Factor in Learning Theory. H. I. Harris.—p. 410.
Distinction Between Loving and Being Loved. L. J. Saul.—p. 412.

Unsatisfactory Results of Psychoanalytic Therapy.—Oberndorf found that the two leading psychoanalytic journals contain, over the past 10 years, practically no articles reporting the results of psychoanalytic treatment. One of the most recent books on technic also fails to mention results. In psychoanalytic treatment the aim is to relieve the patient of symptoms through a radical change in the structure of his personality. Regression to very early periods of life may occur in the course of psychoanalysis, but the repeated reliving of these events does not necessarily produce an assuaging abreaction. The original neurosis may be replaced by a neurotic search for analytic interpretations. The author suggested in 1942 that a case be reviewed in consultation if the patient has been under classical psychoanalytic treatment four to five hours a week, for a total of more than 300 hours. Such a consultation might occur with a group of three experienced psychoanalysts. Such groups might decide if the patient should continue with the same analyst, be considered not well adapted to psychoanalysis or be referred to a second analyst because of transference difficulties leading to therapeutic stasis. It should be recognized that one analyst may fail to achieve satisfactory results with a patient where another may succeed. The author discusses measures that could be undertaken to improve the disappointing results of psychoanalysis. He feels that a questionnaire addressed to analysts as to their experience and opinion would be worth while. The value of the questionnaire will depend on the willingness of analysts to sacrifice some complacency and pride, to discard much of prevalent secrecy and to devote adequate time

and thought to the replies. The questionnaire method might eventually also be extended to patients who have completed their analyses and whose retrospective reactions might supply much valuable insight and data. However, the fairest and probably the most productive approach is the study of each unsatisfactory psychoanalysis by the analyst in conference with his colleagues.

Quarterly J. of Studies on Alcohol, New Haven, Conn.

11:373-526 (Sept.) 1950

Effect of Alcohol on Liver Lipids and on Liver and Heart Glycogen. J. C. Forbes and G. M. Duncan.—p. 373.
Chloride Levels in Blood of Alcoholic Patients in Relation to Phenomenon of Craving. W. D. Silkworth and M. Texon.—p. 381.
Acetaldehyde in Relation to Intoxication by Ethyl Alcohol. L. D. MacLeod.—p. 385.
Role of Acetaldehyde in Toxicity of Tetraethylthiuram Disulfide and Alcohol with Method for Determination of Acetaldehyde in 0.20 Ml. of Blood. D. Lester and L. A. Greenberg.—p. 391.
*Alcoholism and Acute Abdomen. R. Cohn and C. Mathewson Jr.—p. 396.
Transference Phenomenon in Alcoholics: Its Therapeutic Implications. C. L. Brown.—p. 403.
The Washington Movement. M. A. Maxwell.—p. 410.
Drinking Patterns of Italians in New Haven: Utilization of Personal Diary as Research Technique. III. Diaries 6 and 7. P. H. Williams and R. Straus.—p. 452.
Alcoholism in Ayurveda. L. A. Ravi Varma.—p. 484.

Alcoholism and Acute Abdominal Conditions.—Cohn and Mathewson state that alcoholics may present a clinical picture resembling that of any of the other causes of acute abdominal conditions. Since June 1942, 161 patients were observed at the San Francisco Hospital with a history of alcoholism or in an acute alcoholic state and with a primary complaint referable to the abdomen. Observations convinced the authors that most alcoholics with abdominal symptoms respond quickly to a simple regimen of bed rest, intravenous fluids and gastric suction, with no oral intake. The symptoms will usually disappear within 24 hours. It has been the policy of the authors to observe the alcoholic patient hourly, and, if progressive improvement was not noted, another diagnosis was considered. A useful laboratory aid is the flat abdominal roentgenogram taken with the patient in a position to demonstrate free air. In the hospital with which the authors are connected free air was demonstrated in 87 per cent of the patients with perforated ulcer. An elevated level of serum amylase is indicative of acute pancreatitis. A moderately elevated level of serum amylase was found in only one of 18 instances in which the test was made. The patient continued to experience pain at intervals and was believed to have recurrent pancreatitis. The authors present four case histories illustrating the difficulties of differentiation of abdominal symptoms due to alcoholism and perforated ulcer or appendicitis. Long-continued alcoholism may in some cases be followed by peptic ulcer. All the 161 patients had abdominal pain. Nausea and vomiting were common. When the pain was severe it was usually mentioned as the primary complaint. It was not possible to determine accurately whether the pain or the nausea and vomiting came first in the majority of cases. Fourteen of the patients complained of diarrhea. Sixty-two patients had physical signs suggestive of peritoneal irritation. The white blood cell count was elevated only in patients who subsequently were found to have some complication of alcoholism. Gastrointestinal studies were done in only 26 of these patients at the time of admission. Ulcers were not found in any.

Rocky Mountain Medical Journal, Denver

47:649-728 (Sept.) 1950

Intestinal Obstruction. W. H. Cole.—p. 667.
Alcoholism: Problems of Treatment and Research. A. J. Enelow. —p. 673.
Relief of Intractable Pain by Roentgentherapy. M. H. Levine.—p. 678.
Prevention of Mumps in Adults: Preliminary Report. P. R. Farrington. —p. 680.
*The Thyroid and Menstrual Bleeding. J. B. Deisher Jr.—p. 681.

Thyroid and Menstrual Bleeding.—Deisher emphasizes the frequent association of excessive uterine bleeding with hypothyroidism, citing a number of authors who have called attention to this fact. In these patients excessive uterine bleeding is associated with headache and lassitude, often erroneously attributed to anemia. The headache is severe, bursting in character, increasing to throbbing with exertion and unrelieved by the usual analgesics. Diethylstilbestrol, in doses of 0.5 mg. once or twice a day, may give relief in an hour or two. The bleeding may be of a flooding nature. Deisher believes that trial of thyroid therapy may, in many cases, obviate the necessity for curettage or hysterectomy. Thyroid medication is much more acceptable to the patient, much less costly and, when indicated, much more effective than an extended and expensive series of injections of hormone preparations. Physical examination reveals no sharply diagnostic features, but the combination of obesity or nervous slenderness with thickened dry skin, dry hair, cracked finger nails, low pulse pressure and, rarely thyroid enlargement substantiates the diagnosis of hypothyroidism. Pelvic changes are minimal, consisting only of some tenderness of the adnexal tissues. Pathological examination of the endometrium reveals normal or slightly hyperplastic architecture, with no obvious reason for the increase in bleeding. The author cites five illustrative cases.

Southwestern Medicine, El Paso, Texas

31:277-312 (Sept.) 1950

Mr. Ewing's Tribulations. R. B. Homan Jr.—p. 289.
Functional Uterine Bleeding. R. W. Te Linde.—p. 290.
*Use of Frozen Bone Bank Bone in Orthopaedic Surgery. M. H. Leonard, L. W. Breck and W. C. Basom.—p. 292.
Emergency Care, Handling and Transportation of the Injured and Its Importance in the Community. C. B. Young Jr.—p. 296.

Frozen Bone Bank Bone in Orthopedic Surgery.—Leonard and co-workers established a bone bank in El Paso, Texas, in 1949, which has been successfully used by the authors for the past 18 months. Excess bone removed during various orthopedic procedures, resected ribs removed from clean cases and bone from clean amputations which had been stored in a commercial deep freeze establishment at — 18 C. were employed alone as well as to supplement autogenous bone. The clinical response was similar to that which would have occurred had autogenous bone alone been used. No postoperative infection or foreign body reaction were observed. Two illustrative cases are reported. One was that of a child on whom spinal fusion from the third lumbar vertebra to the sacrum was performed with strips of bank bone rib. Roentgen examination made three months after the surgical intervention showed consolidation of the bone graft. The other case was that of a man, aged 65, with fracture of the radius; open reduction and bone graft with the resected distal end of the ulna and bone bank bone were done. Roentgenograms taken three months later showed solid union of the radius.

Texas State Journal of Medicine, Fort Worth

46:669-730 (Sept.) 1950

Obstruction of Gastrointestinal Tract in the Newborn Infant. O. Swenson. —p. 673.
Treatment of Diarrhea with Carob Flour. S. K. Kaliski and D. D. Mitchell.—p. 675.
Diphtheria Prevention: Cases and Carriers in a Local Community. M. L. Fuller.—p. 679.
Management of Convulsive Disorders in Chidren. J. L. Otto.—p. 682.
Practical Points in Preventing Maladjustments in Children. J. G. Young. —p. 685.
Surgical Treatment of Esophageal Lesions. D. L. Paulson.—p. 687.
Aureomycin Therapy in Bacterial Infections Resistant to Penicillin and Streptomycin. E. M. Yow.—p. 694.
Developmental Anomalies of Eye. W. O. Murphy.—p. 698.
Well-Water Methemoglobinemia: Report of Two Cases. M. C. Carlisle. —p. 703.
Use of Adrenal Cortical Hormone in Inflammatory Eye Diseases; Case Report. O. Lippmann.—p. 708.
ACTH and Colchicine in Therapy of Gout: Report of a Case of Acute Gouty Arthritis. H. N. Leopold.—p. 710.
Exfoliative Dermatitis from Dihydrostreptomycin: Report of a Case. B. T. Fein and L. H. Criep.—p. 712.

West Virginia Medical Journal, Charleston

46:245-292 (Sept.) 1950

Without Fear and Trembling. C. E. Watkins.—p. 245.
Highlights of Psychiatry: Past, Present, and Outlook for Future. G. D. Johnson.—p. 248.
6-0 Chromatized Gut in Wound Closure After Cataract Extraction. F. B. Fralick.—p. 251.
Loeffler's Syndrome: Transitory Pulmonary Infiltrations and Eosinophilia: Case Report. G. E. Irvin.—p. 256.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted.
Single case reports and trials of new drugs are usually omitted.

British Journal of Radiology, London

23:513-578 (Sept.) 1950

SYMPOSIUM ON DIAGNOSTIC AND THERAPEUTIC USES OF RADIOACTIVE ISOTOPES

General Problems in Connection with Measurement of Radioactivity in Patients. N. Veall.—p. 527.
Applications of I^{131} and Na^{24} to Clinical Diagnoses. C. P. Haigh and M. Reiss.—p. 534.
Application of Radioactive Isotopes in Case of Multiple Melanomata. R. Marcus and J. Rotblat.—p. 541.
Radioactive Iodine in Diagnosis of Thyrotoxicosis. A. G. Macgregor. —p. 550.
Treatment of Thyroid Carcinoma by Radioiodine. R. Paterson.—p. 553.
Results of Treatment of Thyroid Cancer by Radioactive Iodine: Preliminary Report. H. C. Warrington.—p. 556.
Therapeutic Uses of Radioactive Isotopes in Royal Cancer Hospital. R. J. Walton.—p. 559.
Use of Radioisotopes in Therapy. G. W. Blomfield.—p. 566.

British Medical Journal, London

2:585-638 (Sept. 9) 1950

*Studies on Nature of Intrinsic Factor of Castle. B. E. Hall.—p. 585.
Cortisone (Compound E): Summary of Its Clinical Uses. J. M. Carlisle. —p. 590.
Streptomycin and Neomycin: Antibiotic Approach to Tuberculosis. S. A. Waksman.—p. 595.
Choice of Sulphonamides for Mixture Therapy. D. Lehr.—p. 601.
Medical Treatment of Hydatid Cysts of Lung. M. R. Castex and E. L. Capdehourat.—p. 604.
Recent Advances in Knowledge of Malaria Parasite. H. E. Shortt. —p. 606.

Nature of Intrinsic Factor of Castle.—Hall says that vitamin B_{12} parenterally administered, is as effective in the treatment of pernicious anemia as extracts of liver. However, when administered by mouth, it requires, for its effective utilization the presence of a potentiating agent. In the absence of such an agent, the hematopoietic responses to the oral administration of vitamin B_{12}, in doses up to 100 times the minimal effective parenteral dose, are variable and unpredictable. Potentiation may be provided by known sources of intrinsic factor, such as gastric juice of normal or elevated acidity from human beings and extracts of the stomach and intestines of swine. Concentrated preparations that yield consistently effective and reliable therapeutic results have not yet been produced, owing to the ready destructibility of the intrinsic factor and the consequent loss of a portion or all of the intrinsic factor activity during the process of concentrating gastric or duodenal substances. Studies supporting the concept that the intrinsic factor is of the nature of an enzyme are described.

Indian Journal of Medical Research, Calcutta

38:131-202 (April) 1950. **Partial Index**

Microbiological Assay of Amino-Acids. S. B. Lal.—p. 131.
Studies on Biosynthesis of Nicotinic Acid. S. Banerjee and R. Banerjee. —p. 153.
Phrynoderma: Clinical and Biochemical Investigations. P. S. Menon, P. G. Tulpule and V. N. Patwardhan.—p. 173.
Hematologic and Other Findings in Normal Pregnant Females. B. V. Kothari and Y. M. Bhende.—p. 187.
*Aureomycin and Chloromycetin in Treatment of Experimental Plague. S. S. Sokhey and M. K. Habbu.—p. 197.

Aureomycin and Chloramphenicol in Plague.—Sokhey and Habbu believe that results obtained in their standardized experiments on mice should parallel those of clinical trials. To put a drug to the severest test, the authors started its administration after septicemia had developed, which was 72 hours after the induction of infection. Antiplague serum, a number of sulfonamides, penicillin and streptomycin had been tested previously for their efficacy in the therapy of plague. Aureomycin in a dose of 1 mg. every three hours for the first 12 hours and then every six hours for the rest of the 10 days, i. e., 42 mg. in all, was sufficient to save nine animals out of 10 infected with plague. When the dose of aureomycin was doubled, it still had to be administered for at least seven days for the same results to be obtained. Chloramphenicol, 8 mg. every three hours for the first 12 hours and then every six hours for the rest of the 10 days, i. e., a total of 336 mg., was necessary to obtain the same result. If these drugs were not given in sufficient quantity and for a sufficient number of days, infection recurred and killed some animals even as long as 15 days after the administration of the drug was stopped. These experiments show that both aureomycin and chloramphenicol given by mouth were effective in the treatment of plague.

Journal of Endocrinology, London

6:363-476 (July) 1950. **Partial Index**

Investigations into Phosphorus Metabolism of Adrenal Cortex. M. Reiss and J. M. Halkerston.—p. 369.
*Effect of Hypothyroidism on Reproduction in Female Albino Rat. P. L. Krohn and H. C. White.—p. 375.
Effect of Total Darkness on Growth of Newborn Albino Rat. J. T. Eayrs and K. F. Ireland.—p. 386.
Changes in Renal Function in Man Due to Disease of Anterior Lobe of Pituitary. M. Pickford and J. A. Watt.—p. 398.
Excretion of Urinary Neutral 17-Ketosteroids Following Bilateral Splanchnicectomy and Right Adrenalectomy. E. A. Michie and B. E. Clayton. —p. 423.
Citric Acid and Excretion of Oestrone and Oestradiol. M. S. Edwards, C. H. Gray and M. E. Wood.—p. 440.
Mechanism by Which Progesterone and Other Steroids Inhibit Vaginal Action of Oestradiol. J. M. Robson.—p. 449.
Alloxan Diabetes and Pregnancy: Long-Term Observation. O. Lindan and M. E. Morgans.—p. 463.

Hypothyroidism and Reproduction.—Krohn and White say that there are many indications that hypothyroidism is associated with inadequate reproductive function. Myxedematous women, for example, often suffer from menstrual disturbances and seldom conceive and bear children. Experimental analysis of the relation between the thyroid and ovary has not, however, led to clearcut conclusions. The effects of hypothyroid conditions on the reproductive processes of the female albino rat were therefore studied afresh, and the results of thyroidectomy and of chemical suppression of the thyroid compared. Some observations were made also on the rate of development of the litters from the treated rats. The authors found that pharmacologic suppression was more effective in causing a consistent depression of the metabolic rate than was surgical ablation of the thyroid. The estrous cycle tended to be longer, especially in thyroidectomized animals, and more variable in length. Hypothyroid animals ovulated and conceived, but fewer young were brought to term than in a previous normal pregnancy, due to resorption of fetuses at varying stages of gestation. The young of rats receiving thyroid-suppressing drugs all died by the end of the fourth week after birth, but the young from thyroidectomized mothers developed normally. It is suggested that the young of animals who had been injected died because suppression of the fetal thyroid by thyroid-depressing drugs which passed from the mother both before and after birth prevented normal development. It is not yet clear whether the interference with reproduction caused by hypothyroidism can be explained adequately by a general slowing down of cellular activity or whether any specific hormonal mechanism is primarily involved.

Proceedings of Royal Society of Medicine, London

43:579-688 (Aug.) 1950. **Partial Index**

Anoxia and Anaesthesia. B. G. B. Lucas.—p. 606.
Electrolytic Misadventures in Infancy. W. W. Payne.—p. 616.
Medical Applications of Microwave Diathermy: Laboratory and Clinical Studies. F. H. Krusen.—p. 641.
Transantral Neurotomy and Sealing of Foramen Rotundum for Neuralgia. W. O. Lodge.—p. 659.
Surgical Treatment of Laryngocele. H. P. Lawson.—p. 662.
Carcinoid Tumours of Rectum. R. W. Raven.—p. 675.

Acta Radiologica, Stockholm

33:389-490 (May) 1950. **Partial Index**

Percutaneous Angiography of Vertebral Artery. E. Lindgren.—p. 389.
*Patent Ductus Arteriosus: Diagnosis by Introduction of Catheter Through Ductus from Pulmonary Artery into Aorta. J. Karnell, G. Jönsson and B. Brodén.—p. 405.
Fever in Slow Radium Therapy in Otherwise Uncomplicated Cases of Cervical Carcinoma. V. Kahanpää.—p. 412.
*Hodgkin's Disease and Pregnancy. J. Bichel.—p. 427.
Physical Aspects of Roentgen Radiation from Beryllium Window Tube Operated over 2-50 Kilovolt Range for Clinical Purposes. W. A. Jennings.—p. 435.

Patent Ductus Arteriosus.—Karnell and his associates discuss the various roentgenologic methods for the diagnosis of patent ductus arteriosus. The angiocardiographic method had been in use for about 10 years, but no one had succeeded in visualizing the ductus directly, and the indirect signs proved to be more or less unreliable. Castellanos' method, using countercurrent injection of opaque substance into the brachial artery, was not suitable for routine purposes. The authors were able to make a diagnosis in some cases of patent ductus arteriosus by means of thoracic aortography. This method can be used in adults, is more difficult in children, and in infants almost impossible. If the ductus is wide, it is possible to maneuver a catheter inserted in the pulmonary artery through the ductus into the aorta. This is the most direct way of establishing the presence of a patent ductus. It does not involve any new and troublesome manipulation for the patient. The heart must be catheterized anyway, and when the catheter is in the pulmonary artery an attempt can be made to push it farther through a patent ductus. If there is no success after a few minutes, the attempt should be given up. Unless a ductus is found almost at once, the chances are that none is present or that it is not wide enough for catheterization. The authors used catheterization in 10 cases of patent ductus, and they were able to push the catheter through the ductus in four of these. Since patent ductus is not a rare defect and since catheterization must have been done in many such cases, the authors assume that they were probably not the first to insert the catheter through the ductus. They find it surprising that no one has called attention to the diagnostic value of this procedure.

Hodgkin's Disease and Pregnancy.—At the Radiological Clinic in Aarhus, Denmark, Bichel observed the course of Hodgkin's disease in 81 women, 11 of whom became pregnant. The literature contained rather detailed reports of 46 women in whom Hodgkin's disease was complicated by pregnancy. Thus it was possible to study 57 cases in which a total of 65 pregnancies occurred in the course of Hodgkin's disease. Of the 65 pregnancies, 42 were carried to term. A larger number of observations is necessary before the influence of pregnancy on Hodgkin's disease, and vice versa, will be clear but on the basis of the observations so far obtained, the author feels justified in concluding that conception frequently occurs in women with Hodgkin's disease, that from an obstetric point of view the pregnancy, parturition and puerperium run a normal course in the great majority, and that acute exacerbation of the disease is not more frequent during pregnancy than could be expected without it. Only one case is on record in which the mother died during pregnancy. Only one case has been reported in which it can be said with a reasonable degree of certainty that intrauterine transmission from mother to child took place. Generally, there will be no indication for interruption of pregnancy in patients with Hodgkin's.

Journal de Médecine de Lyon

31:627-678 (Aug. 5) 1950

*Chloramphenicol in Treatment of Typhoid Fever. S. Sédallian, R. Maral, C. Exbrayat, J. Traeger and L. Gaillard.—p. 627.
*Considerations on Modern Treatment of Tuberculous Meningitis of Adults. P. Sédallian, R. Maral and C. Exbrayat.—p. 643.
Permeability of Meninges in Course of Meningitis, Particularly in Tuberculous Meningitis. P. Sédallian, R. Maral, J. Traeger and G. Aventurier.—p. 673.

Chloramphenicol in Typhoid.—Sédallian treated 119 patients, 85 adults and 34 children, who had typhoid with chloramphenicol (chloromycetin®). The author regards an initial massive dose as useless and even dangerous. It could have been partly responsible for the fatal cardiovascular collapse which took place in six patients 18 hours to three days after the dose was given. A dose of 50 to 60 mg. per kilogram of body weight should be given by mouth every four hours for 15 days. Treatment should be continued with a dose of 25 to 30 mg. per kilogram of body weight for at least five additional days in cases in which cultures of feces remain positive. The patient is to remain in bed for one week after discontinuation of the drug. He may be discharged from the hospital one week later. Recovery resulted in 95 per cent of the patients. Temperature became normal gradually in 65 per cent of the patients and by a sudden drop within 24 hours in 30 per cent. Defervescence occurred in two stages with intervening fever in 5 per cent of the patients, most of them children. A mild rise in temperature recurred between the tenth and twentieth days in 20 per cent. Headache subsided rapidly, but insomnia disappeared only after the temperature became normal. Diarrhea continued occasionally for eight to 10 days after discontinuation of the drug. Diminution of the size of the spleen was observed usually at the time of or soon after the temperature became normal. Chloramphenicol probably prevents the ocurrence of new intestinal ulcers, but it does not hasten the healing of ulcers. Only two patients had intestinal hemorrhages. Intestinal perforation and phlebitis were not observed. The course of the disease was shortened and convalescence was hastened. Twenty patients had recurrences but responded well when treatment was resumed. Only early and prolonged treatment will reduce the high incidence of relapses. Chloramphenicol seemed to be ineffective in bacilli carriers. Although chloramphenicol is a highly valuable drug, prophylactic treatment with typhoid vaccine should not be neglected.

Modern Treatment of Tuberculous Meningitis.—Sédallian and co-workers report on 173 patients over 14 years of age with tuberculous meningitis who were admitted to the hospital during the period of May 1947 to October 1949. Of the 173 patients, 132 were admitted before Aug. 1, 1948, and 17 of them are living. Forty-one were admitted after Aug. 1, 1948, and 17 of them survived and are in a state of clinical recovery. Comparison of these two groups shows in a general way the progress made. The patients admitted after Aug. 1, 1948, were in a less serious condition because diagnosis had been made earlier. Methods of treatment had been improved. Mildly abnormal cerebrospinal fluid during or after treatment for miliary tuberculosis suggests a caseating meningitis in an early stage and requires treatment. Transitory meningitic episodes associated with tuberculous nonmiliary primary infection may regress spontaneously within a few days. Except for rare cases, combined treatment by intramuscular and intraspinal route should be instituted in all cases in which the diagnosis of tuberculous meningitis has been established. Streptomycin, para-aminosalicylic acid and glucosulfone sodium (promin®) and its derivatives were the drugs employed. A few patients made a rapid recovery, with cerebrospinal fluid restored to nearly normal after 25 days of treatment. Treatment by intramuscular route was discontinued on the hundred and fifty-fifth day, and recovery was maintained for 21 months after discontinuation of the drug. The majority of the patients showed definite improvement in the cerebrospinal fluid in the course of the fourth or fifth month of treatment, which in general was discontinued after the fifth or sixth month, when the cerebrospinal fluid was restored to nearly normal. Two patients showed late improvement and were in a confusional state for four months. They made a satisfactory clinical recovery after eight months of treatment, and the recovery was maintained for 23 and 16 months, respectively, after treatment was discontinued. Two patients had a recurrence but recovered when treatment was resumed. One late fatal recurrence was observed one year after the first course of treatment was terminated. Clinical recovery usually occurred much earlier than the restoration of the cerebrospinal fluid to normal, the latter requiring seven to 10 months. Follow-up examinations should be made every two weeks for two months following discharge from the hospital. One monthly examination is advisable for the next six months and several additional examinations every second or third month, making a total follow-up period of 18 months.

Medisch Maandblad, Djakarta

3:233-264 (July 1) 1950. **Partial Index**

*Abscess Tonsillectomy. R. A. J. Niels.—p. 233.
Clinical Experiences in Treating Epidermophytosis with Fatty Acids. Tio Biauw Sing.—p. 237.

Abscess Tonsillectomy.—Niels reviews observations on 22 cases of peritonsillitis treated at his hospital. The process was bilateral in two of these cases. Incision, done in four of the 22 patients, proved effective in three. The patient in whom incision was not effective and the 18 other patients were treated by bilateral tonsillectomy *à chaud*. The operation was done under local anesthesia. Tonsillectomy for peritonsillar abscess produces a complete cure. The tonsil not complicated by an abscess should be removed at the same time the abscessed tonsil is being removed.

Revista Chilena de Pediatria, Santiago

21:289-328 (July) 1950. **Partial Index**

*Bone Changes in Leukemia in Children. J. Hasbun and R. Eberhard.—p. 289.
Tuberculoma of Brain in Infants. Z. Fuentes A.—p. 298.

Bone Changes in Leukemia.—Hasbun and Eberhard report nine cases of acute lymphatic leukemia in children in whom the diagnosis was facilitated by periodic roentgen examination of the bones. Bone lesions visible in the roentgenograms are frequent in acute lymphatic leukemia of children. Lesions in eight cases were located in the distal metaphysis of the femur and in the distal ends of the radius and the ulna in one case. The roentgen picture was of the osteolytic type in five cases and of the osteochondrotrous subperiosteal and osteosclerotic types in the other four cases. Osteomyelitis is differentiated from acute lymphatic leukemia, in patients who present bone lesions and local pain, by examination of the blood and the bone marrow obtained by sternal puncture.

Tuberkulosearzt, Stuttgart

4:309-370 (June) 1950. **Partial Index**

Investigations on Mode of Action of Pneumoperitoneum with Special Consideration of Roentgen Kymography. H. Böhme.—p. 310.
Etiology and Therapy of Spontaneous Pneumothorax. U. Bormann.—p. 316.
*Intracavitary Injection of Chemotherapeutics in Children and Adolescents. N. Ebers.—p. 319.
Interruption of Phrenic Nerve and Pneumoperitoneum in Treatment of Upper Lobe Cavity. A. Emmler.—p. 324.
Symptomatology and Therapy of Pleuritis Sicca. A. Grimminger.—p. 331.
Use of Laevoral, a Substance to Protect the Liver to Increase Tolerance for Thiosemicarbazone. E. Köhler.—p. 335.
Contralateral Pneumothorax and Thoracoplasty. D. Schwenkenbecher.—p. 337.
Chemotherapy in Laryngeal Tuberculosis. R. Ginader and L. Rickmann.—p. 340.

Injection of Chemotherapeutics into Pulmonary Cavities.—Ebers employed intracavitary injections in six children and adolescents. He believes that intravenous injection of chemotherapeutics can be tried in cases of cavitary tuberculosis in which the pleural cavity is obliterated and in which extent and toxicity of the tuberculous process make other therapeutic measures inadvisable. The intracavitary injection can be given either in preparation for a surgical intervention or as a last resort. There are cavities which, because of their proximity to large pulmonary vessels, do not permit intracavernous injection. The choice of the site of injection, whether at the front or back of the thorax, is determined by tomographic examination; that is, the shortest distance is taken. The injection is made with the patient on the tilted x-ray table. The patient is placed so that the cavity is struck by the central beam. The injection is made with a syringe which has a cannula 8 to 10 cm. in length. When the intercostal space has been entered, a roentgenologic control is made to check the direction of the cannula, which is then pushed forward while air bubbles or secretion are aspirated. Penetration of the wall of the cavity can sometimes be felt. The patient should rest in bed for a day after the injection. At first, injections are made two or three times and later once weekly. The authors used a 2 per cent suspension of 4-acetylaminobenzaldehyde thiosemicarbazone (conteben® or Tb 1-698) in distilled water, a 2 per cent suspension of the same substance in a 4 per cent solution of paraaminosalicylic acid, a 4 per cent solution of paraaminosalicylic acid without the addition of the thiosemicarbazone preparation, a 10 per cent solution of streptomycin or a soluble derivative of the aforementioned thiosemicarbazone. The quantity injected was 2 to 4 cc. The early results were better than any with any other method. Continuation of these therapeutic experiments is therefore advisable, although the method is not without danger.

Wiener medizinische Wochenschrift, Vienna

100:441-468 (July 1) 1950. **Partial Index**

Psychogenic Disorders of Menstruation. A. Mayer.—p. 443.
Serum Hepatitis in Pernicious Anemia. J. Beyreder.—p. 447.
*New Possibilities of Salicylic Acid Therapy: Intravenous Therapy with Solusal® (Ethanolamine Salt of Salicylic Acid). W. Blumencron and E. Borkenstein.—p. 449.

New Possibilities of Salicylic Acid Therapy.—According to Blumencron and Borkenstein, the intravenous route for administration of salicylic acid is superior to any other with respect to rapidity and duration of effect on true rheumatism. It is the method of choice in recurrences, in which oral administration has lost its efficacy because of habituation to the drug. The prompt effect of intravenous administration is the result of the thrustlike production of a high salicylic acid concentration in the blood. A higher salicylic acid concentration in the blood may be obtained with ethanolamine salt of salicylic acid (solusal®) administered intravenously than with sodium salicylate. This higher concentration of the drug may be maintained for at least 10 hours by a repeated injection of solusal.® The average blood serum value was 26 mg. per 100 cc. five hours after the injection of 10 cc. of 20 per cent solusal,® while it was 10.5 mg. per 100 cc. after the injection of 20 cc. of 10 per cent sodium salicylate. The maximum salicylic acid effect may thus be obtained by this route with much smaller doses than by any other route. Untoward reactions to salicylic acid are avoided. There was not a single instance of albuminuria, so that intravenous salicylic acid therapy may be practiced even in the presence of renal lesions. Intravenous administration was well tolerated by patients in whom administration of small doses by mouth was not feasible because of intolerance. Intravenous injections of solusal® were well tolerated by highly sensitive patients, provided they were made slowly and provided the contents of the syringe were mixed with the patient's blood. The rapid effect of the intravenous salicylic acid injection on the symptoms of true rheumatism makes it possible to use it as an aid in differential diagnosis of true rheumatism from other types of rheumatism. Only an analgesic effect may be expected from salicylic acid preparations in focal forms of rheumatism and in rheumatoid forms, but it may be more pronounced in intravenous than in oral administration of the drug.

100:469-492 (July 22) 1950. **Partial Index**

Causes of Immediate and Late Failure of Surgical Intervention on Stomach for Ulcer and Its Complications. H. Finsterer.—p. 472.
*Preliminary Results of Vagotomy for Peptic Jejunal Ulcer (Recurrent Ulcer). F. Mandl.—p. 476.
Rheosphygmography, New Method for Diagnosis of Peripheral Vascular Diseases. H. Jantsch.—p. 478.

Vagotomy for Peptic Jejunal Ulcer.—Mandl performed vagotomy on 15 patients with an ulcer recurring after gastrectomy. In three of these patients, 19 to 28 years had elapsed since the gastrectomy. One of the 15 patients died from a suppurative meningitis on the tenth day after the vagotomy. Only one month had elapsed since the vagotomy was performed in another patient, and the follow-up period was, therefore, too short to permit definite conclusions. Complete recovery resulted from vagotomy in six patients. Two patients were therapeutic failures. One patient made an uneventful recovery but died from uremia three months after the vagotomy; his case is considered as doubtful. Evaluation of results is not easy in the four remaining cases. One patient had been operated on four times for peptic jejunal ulcer which was considered as surgically incurable; vagotomy was performed, but only temporary improvement resulted. Carcinoma simulating a recurrent jejunal ulcer 19 years after gastrectomy was revealed by necropsy nine months after the vagotomy in one case. Vagotomy was incomplete because detection of the posterior branch of the vagus was impossible in one case with gastrocolic fistula. Death resulted from severe hypoproteinemia in spite of vagotomy in one patient. Vagotomy offers many advantages as compared to radical methods in clear cases of peptic jejunal ulcer.

BOOK NOTICES

The reviews here published have been prepared by competent authorities and do not represent the opinions of any official bodies unless specifically stated.

Annual Reprint of the Reports of the Council on Pharmacy and Chemistry of the American Medical Association with the Comments That Have Appeared in The Journal of the American Medical Association, 1949. Cloth. $2. Pp. 231. J. B. Lippincott Company, 227-231 S. 6th St., Philadelphia 5; Aldine House, 10-13 Bedford St., London, W.C.2; 2083 Guy St., Montreal [n.d.].

Of the six excellent reports on the status of various therapeutic preparations and procedures contained in this volume, perhaps the most noteworthy is the progress report "Estrogens and Androgens in Mammary Cancer," which presents an admirably organized study of the problem, and which is to be continued with procedures revised in the light of experience. The present conclusion is that steroid hormones represent a new weapon for the palliative treatment of breast cancer, to be used in those cases in which surgical or irradiation treatment, or both, cannot be applied or have proved unsuccessful. The other reports in this category are equally well planned and informative. That on organomercurial compounds represents a continuation of the Council's effort to encourage the development of more objective evidence concerning the true value of this class of compounds. The report of Grimson and co-workers, "Newer Adrenolytic, Sympatholytic and Ganglionic Blocking Drugs," is a brief but careful evaluation of several agents for use as substitutes for regional sympathetic block or actual sympathectomy in peripheral vascular disease problems.

The three papers "Aluminum in the Therapy and Prophylaxis of Silicosis," "Status Report on Analeptics" and "New Analgesics" emphasize methods and procedures for investigation and evaluation and are thus related to the Luykx paper, "Progress Without Statistics," and the two sponsored by the Council's Committee on Research, "Methods of Clinical Study and Evaluation of Therapeutic Agents in Poliomyelitis," and "Fundamental Scientific Research Essential to Progress in Applied Therapeutics." Together, these form an illuminating and instructive commentary on the methods and procedures of modern therapeutic research. Certainly they evidence the Council's increasing preoccupation with this field.

The report consigning sulfathiazole and sulfathiazole sodium to the therapeutic discard, one rejecting a pseudoscientific antiobesity preparation, Pit-thyrocas, and the mention of a long list of cancer "cures" in the report "Cancer and the Need for Facts," alone represent the type of condemnatory report that in other years formed so large a part of the collected reports. Eight reports on adoption of protected and generic names for drugs, the report of the Council's annual meeting, some instructive comments on the Council's rules and a statement on the legal requirements for prescription writing round out the contents of this small but extremely valuable book.

New and Nonofficial Remedies, Containing Descriptions of the Articles Which Stand Accepted by the Council on Pharmacy and Chemistry of the American Medical Association on January 1, 1950. Issued under the Direction and Supervision of The Council of Pharmacy and Chemistry, American Medical Association. Cloth. $3. Pp. 800. J. B. Lippincott Company, 227-231 S. 6th St., Philadelphia 5; Aldine House, 10-13 Bedford St., London, W.C.2; 2083 Guy St., Montreal, 1950.

Though it seems somewhat irreverent to apply the overworked term streamlined to such an authoritative and dignified volume, the dark blue cover with gold lettering and the lines of the 1950 edition, together with the new typeface employed, immediately suggest the word. This characteristic of the cover is carried out in the editorial attention that has obviously been given to the text. Comparison with the 1949 volume will show that an attempt has been made to eliminate repetitious and unnecessary phraseology and to achieve more logical arrangement of material (for example, that in the vitamin chapter), in effect, to give the book a more homogeneous character. Still further effort in this direction might be desirable. A new and significant section has been added: a list of trade names recognized by the Council for pharmacopeial preparations which are now excluded from the book by the rule that products of 20 years' official standing are not accepted for consideration. The continued operation of this rule gives additional verisimilitude to the words "new" and "nonofficial" in the title. The relegation of tests and standards for accepted nonofficial preparations to a separate section is continued. This section has been made more readable by the change to a clearer type.

About 58 new preparations have been added, including antihistaminics, sulfonamide mixtures, antibiotics, a water-soluble vitamin A, and vitamin B_{12}. Many of these stand accepted under protected names and appear under the recognized generic designations. There has been no radical revision of the text, but several chapters, including that on the vitamins already referred to, have been judiciously rearranged in the interest of clarity and accessibility of the material. Notable among these are the chapter on hormones and synthetic substitutes and the two chapters on anti-infectives.

Communicable Diseases. Edited by Roscoe L. Pullen, A.B., M.D., F.A.C.P., Professor of Graduate Medicine, School of Medicine, Tulane University of Louisiana, New Orleans. Cloth. $20. Pp. 1035, with 273 illustrations. Lea & Febiger, 600 S. Washington Sq., Philadelphia 6, 1950.

It is an interesting commentary on medical writing that for many years there has been a crying need for a comprehensive monograph on infectious disease in spite of the fact that during the past two decades the practical advances in this field have probably been greater than in any other branch of clinical medicine. Medical students and physicians have had to rely on textbooks of general medicine and of bacteriology and immunology, current medical periodicals, and specialized monographs dealing with chemotherapy and with single infections, in order to keep abreast of advances which have literally revolutionized the management of many communicable diseases. The volume is designed to cover the entire field of contagious illness. Its 60 chapters were written by 53 authors, 39 of whom are either active or former faculty members of the Tulane and Louisiana State Medical Schools in New Orleans. Discussion of the individual diseases is presented in an orderly manner, the classification used being based on the predominant clinical manifestation caused by the infection, i. e., involvement of skin, respiratory tract and nervous system. There are numerous instructive illustrations, tables and charts, and most of the chapters include rather comprehensive bibliographies.

The subject matter covered is almost entirely clinical, and the text is for the most part descriptive. Herein lies the most serious defect in the monograph. No branch of clinical medicine can today be adequately taught to undergraduate or postgraduate students without a strong emphasis on pathological physiology. Many of the chapters fail to touch on mechanisms of pathogenesis, recovery and prophylaxis, discussions of which would greatly increase the reader's understanding of each of the diseases described. To be sure, the recently published companion volumes of Dubos and Rivers dealing with bacterial and viral infections present the mechanistic approach to microbial disease, but these are essentially textbooks of microbiology rather than of clinical medicine. For the clinician to appreciate the true nature of any infection and the rationale of its management, he must have a clear understanding of both the behavior of the invading parasite and the defense mechanisms of the host. If in future editions discussions of these important matters, which by too many clinicians are considered of only theoretical interest, can be added to the otherwise excellent text, the over-all value of the monograph will be greatly increased. In its present form this comprehensive volume is certain to serve a most useful purpose and will undoubtedly be widely read not only by medical students but also by practicing physicians.

A Textbook of Histology: Functional Significance of Cells and Intercellular Substances. By E. V. Cowdry, Professor of Anatomy, The School of Medicine, Washington University, St. Louis, Mo. Fourth edition. Cloth. $8.50. Pp. 640, with 337 illustrations. Lea & Febiger, 600 S. Washington Sq., Philadelphia 6, 1950.

Again thoroughly revised, the present edition of this work is considerably expanded beyond the third edition (1944). The first two editions were written for keener, more mature students and studiously avoided illustration or discussion of what becomes evident in the laboratory. The streamlining of factual content that took place in the third edition has been maintained, but the text has been expanded by additional use of comparative tables and elementary introductory remarks. There are many new references and some new figures. The thoroughness of each of the three revisions, with attendant fluctuations in volume, has not diminished the distinctive character of Cowdry's text. The treatment remains a personalized, highly selective account of the major aspects of histology, with some topics, notably skin and blood, selected for emphasis. The vitality of presentation is matched only in earlier editions. Current research activity is pointed up by references to illustrations in "Life" magazine and admonitions to watch for the publications of particular authors. The frankly partisan presentation of existing controversies is possibly a desirable stimulant to the critical student.

It is clear what Cowdry thinks a course in histology should be and also what attitude should, according to him, be cultivated in the student. These opinions require thoughtful consideration by both instructor and student. For the instructor who agrees with this emphasis and approach, this edition is a distinct advance. Where lectures are designed to deal amply with other aspects of histology, the book provides interesting auxiliary material. The text assumes laboratory familiarity with human material and with some fresh preparations. A set of questions on each chapter is included. The book is thus geared to integration in the medical curriculum as a prime objective rather than to function as an authoritative reference on minutiae.

Pye's Surgical Handicraft: A Manual of Surgical Manipulations, Minor Surgery, and Other Matters Connected with the Work of Surgical Dressers, House Surgeons and Practitioners. Edited by Hamilton Bailey, F.R.C.S., Surgeon, and Surgeon-in-Charge of the Genito-Urinary Department, Royal Northern Hospital, London. Sixteenth edition. Cloth. $6. Pp. 724, with 830 illustrations. The Williams & Wilkins Company, Mount Royal and Guilford Aves., Baltimore 2, 1950.

This edition of this popular surgical handbook has been rewritten with emphasis on standard surgical principles and technics. The concise paragraphs and numerous illustrations explain fundamental principles of handling of common surgical problems. First aid is emphasized, technics for emergency and minor surgery are outlined, and there is a description of available instruments and the standard use of bandages and casts. Though not a reference textbook on surgery, this handbook is a practical and detailed outline which should aid medical students and general practitioners. It should also afford interesting reading for those with more detailed surgical experience. The content of the book is appropriately described by its title, "Surgical handicraft," and the book is recommended to those desiring information on simple and standard general surgical technics.

Techniques in British Surgery. Edited by Rodney Maingot, F.R.C.S. Cloth. $15. Pp. 733, with 473 illustrations. W. B. Saunders Company, 218 W. Washington Sq., Philadelphia 5; 7 Grape St., Shaftesbury Ave., London, W.C.2, 1950.

This work represents a compilation of articles by 29 British surgeons, each of whom is an authority in his field. While the title may suggest that surgical technics are different in Britain, this is not the case. Surgical procedure today in Britain is not different from that practised in the United States, or, for that matter, anywhere else.

The arrangement of the material is not well balanced. The space devoted to orthopedic procedures greatly overbalances such timely subjects as surgery of the gastrointestinal tract. It seems that in a one volume work, a chapter on so highly specialized a subject as mammaplasty, to which 15 pages are devoted, is obviously a superfluity. The section on the surgical treatment of pulmonary tuberculosis is timely and well written. It is felt that the term "incautious" should be discarded from a surgical textbook, for caution is the keynote of all surgery (page 291, figure 179). The section on acute infections of the hand is well written but, here again, too abbreviated. A better correlation of subject matter would be desirable. For example, article 13 deals with benign strictures of the rectum and is followed by cysts of the epididymis, which precedes a chapter on carcinoma of the head of the pancreas only to be followed by an article on some surgical aspects of gastric surgery, which is succeeded by an article on hypospadias, and, immediately after this, an article on aseptic intestinal anastomosis. Among others, some of the outstanding articles in this compilation are on the surgery of the thyroid gland and the procedures relating to thoracic surgery. Some of the illustrations are excellent; others are too diagrammatic.

Types of Diabetes Mellitus and Their Treatment. By Arthur R. Colwell, M.D., Associate Professor of Medicine and Director of Medical Specialty Training, Northwestern University Medical School, Chicago. Publication Number 67, American Lecture Series, A Monograph in American Lectures in Endocrinology. Edited by Willard O. Thompson, M.D., Clinical Professor of Medicine, University of Illinois College of Medicine, Chicago. Cloth. $2.25. Pp 97, with 6 illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 49 Broad St., Oxford, England; The Ryerson Press, 299 Queen St., W. Toronto 2B, 1950.

The author is one of the best qualified students of clinical diabetes in the United States and presents material for the general clinical reader in well chosen language, appropriately condensed for quick perusal and based at all times on clinical rather than theoretical considerations. This volume is a handbook for quick reference for the physician who does not see many patients with diabetes but who wants to know how to take care of his diabetics in the most thoroughgoing and safe way. The point of view is not limited to any one of the several types of dietary treatment of diabetes nor does the author show any favoritism for a particular type of insulin. Although this is in no sense a manual for the mutual use of physician and patient, sufficient information is included herein so that a physician can provide for a patient, in typed or mimeographed form, essential information about foods and other problems of the diabetic, for the management of any of the ordinary cases of diabetes encountered in clinical practice. It is important to note that the directions for the safe and thoroughgoing management of emergencies, including coma, infections and surgical operations are based on the time-tested practical scheme devised by Dr. R. T. Woodyatt. In a field where the clinical and experimental literature is so voluminous, the author has made a selection of 50 bibliographic references, which will be of real value to the clinical reader who wants to be abreast of the important recent publications. This book can be recommended confidently to any physician who wants a condensed and simple manual for the treatment of diabetes.

Plastic and Reconstructive Surgery: A Manual of Management. By Ferris Smith, M.D., F.A.C.S., Consultant in Plastic Surgery, Blodgett Memorial Hospital, Grand Rapids, Michigan. Cloth. $15. Pp. 895, with 592 illustrations. W. B. Saunders Company, 218 W. Washington Sq., Philadelphia 5; 7 Grape St., Shaftesbury Ave., London, W.C.2, 1950.

The purpose of this book is to present and emphasize the trend of plastic surgery since World War I. The basic principles of plastic surgery are discussed, and methods of application are evaluated. The author states in his preface that such conditions as hypospadias and epispadias should be corrected by the urologic surgeon, absence of the vaginal tract by the gynecologist and lesions of the tendons, nerves and bones by the orthopedist.

The first chapter, which contains general considerations, is particularly well presented. More space could have been devoted to the section pertaining to plastic and reconstructive surgery of the breast. Although this subject was well presented in the eight pages devoted to it, the operative procedures should have been presented in the form of illustrations along with the preoperative and postoperative photographs shown. The book is well written and well printed. Numerous preoperative and postoperative photographs are shown, and these are always convincing. This will make an excellent reference book for those interested in plastic and reconstructive surgery.

Surgery of Cataract. By Daniel B. Kirby, A.M., M.D., LL.D., Professor of Ophthalmology, College of Medicine, New York University, New York. Cloth. $30. Pp. 695, with 339 illustrations. J. B. Lippincott Company, 227-231 S. 6th St., Philadelphia 5; Aldine House, 10-13 Bedford St., London, W.C.2; 2083 Guy St., Montreal, 1950.

This masterful treatise is the most comprehensive work of this kind ever to appear. It is so ample that at times it is almost repetitious. In a wide exploration of the literature of cataract surgery, there are numerous extensive direct quotations, not always readily distinguishable from the author's original material. One wonders whether a greater purpose would not have been served by less verbiage so that the book might be sold in a price range with a wider appeal, especially to the beginning ophthalmic surgeon for whom a study of this work would be most beneficial. Binding, printing and the numerous illustrations, many of them in color, are of the highest caliber.

There is assembled a complete account of the history of the cataract operation as far as it is known for the past 3,000 years, with a detailed description of the early couching operation and the evolutional process involved in the development of the modern methods employed. Further chapters deal with the basic subjects of embryology, anatomy, physiology and pathology of the lens and asepsis and antisepsis. Instruments are described in detail, especially those favored by the author. In the drama of cataract surgery, the author brings a touch of philosophy and theology into the discussion of the training and preparation of the eye surgeon. Consideration is given to the importance of the preoperative examination of the patient and to the standards for judging progress or arrest of lens opacities. In a review of the nonsurgical treatment of cataract, there is emphasized the lack of results from all known methods of this type of treatment.

The etiology and classification of cataracts are considered at length and indications given for extracapsular and intracapsular extractions, with the latter favored in most instances. This is quite in keeping with present trends, and, while all accepted technics are described, the detailed steps and procedures developed by the author and published in numerous previous articles are systematically emphasized. Most eye surgeons develop the practices learned from a variety of sources which best fit their particular capability and temperament. There can be no doubt that Dr. Kirby's technic is highly satisfactory, and whether or not the reader decides to adopt the method in toto he will find concretely expressed many ideas which may be applied and adapted to personal needs. The chapter on the prevention and handling of complications is particularly practical. The chapter on the correction of aphakia is particularly valuable, since this phase has received a minimum of attention in the past, with the drama of the surgical procedure completely overshadowing the necessity of proper optical correction of the defect resulting from loss of the lens.

It is likely to be a long time before any book on the surgical aspects of the cataract operation approaches the volume of material in this monumental compilation, and while the cost will deter many from owning the volume those with extensive interest in the subject will give it an important place in their libraries.

Personality in Peptic Ulcer. By Albert J. Sullivan, M.D., Head of Section on Gastroenterology, Ochsner Clinic, Tulane University of Louisiana School of Medicine, New Orleans, and Thomas E. McKell, M.D., Instructor in Medicine, Tulane University of Louisiana School of Medicine, New Orleans. Cloth. $3. Pp. 100, with 13 illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 49 Broad St., Oxford, England; The Ryerson Press, 299 Queen St., W., Toronto 2B, 1950.

This is an interestingly and convincingly written little book indicating that intrinsic (personality) psychic factors and extrinsic psychological factors (emotional situations) serve as predisposing and excitatory causes of peptic ulcer. Data and cases are presented, and the role of psychotherapy is pointed out. The authors properly emphasize "that adequate treatment depends upon proper evaluation of the numerous etiologic factors involved in the production of each individual case of peptic ulcer." In view of the title, the saneness of the book is refreshing. The book will be helpful to those who desire a good orientation toward the role that personality and emotional factors play in so-called psychosomatic disorders.

Physician's Handbook. By Marcus A. Krupp, M.D., Assistant Clinical Professor of Medicine, Stanford University School of Medicine, San Francisco, Norman J. Sweet, M.D., Assistant Professor of Medicine, University of California School of Medicine, San Francisco, Ernest Jawetz, Ph.D., M.D., Associate Professor of Bacteriology, University of California School of Medicine, San Francisco, and Charles D. Armstrong, M.D., Clinical Instructor in Medicine, Stanford University School of Medicine, San Francisco. Sixth edition. Boards. $2.50. Pp. 380, with illustrations. University Medical Publishers, Post Office Box 761, Palo Alto, California, 1950.

It is amazing how many facts the authors have been able to compress into this small book. It is in a sense a counterpart for medicine to the well known "Handbook of Chemistry and Physics," and is similarly encyclopedic in its coverage. The first chapters are on general and specialized types of physical examinations. One is reminded, for example, how to test the fifth cranial nerve, or one may find a table showing the normal range of motion in ulnar deviation of the wrist. Then follow chapters on roentgen examinations, electrocardiography and special procedures in various specialties. The next sections are largely concerned with therapy; here, technics of treatment are described and a list of drugs and dosages given. Finally, most of the remainder of the book is concerned with laboratory technics, which are most simply and usefully stated.

No student or physician can ever remember all the facts he needs nor even their interpretations. This handbook will almost surely give him details of any procedure he is looking for or may even suggest a procedure to him, with a two-line explanation of what it means. Although there is now no dearth of pocket handbooks of medicine, this is certainly one of the best and will please any user. Criticisms are hard to make, for the content and format are both excellent. One might wish for an occasional credit line, but it is characteristic of most handbook material that the popularity of the context soon hides its origin.

Soviet Psychiatry. By Joseph Wortis, M.D., Assistant Clinical Professor of Psychiatry, New York University College of Medicine, Brooklyn. Cloth. $5. Pp. 314. The Williams & Wilkins Company, Mt. Royal & Guilford Aves., Baltimore 2, 1950.

This monumental work of Dr. Wortis is based on about 7,000 items from the Russian neuropsychiatric and political literature covering a period of over three decades. The author wisely devotes the first chapter of his book to a careful discussion of the ideology of Soviet Russia. Against this background, he focuses the materialistic and practical bent of Russian scientific thinking as contrasted with the philosophical idealism of the West.

The cornerstone of the materialistic orientation is that "mind is a function of matter and derivative from and secondary to it." Soviet psychiatry is, therefore, organically oriented with pavlovian physiology as the nucleus and cannot accept the concept of the unconscious, which is the foundation of freudian psychology. Wortis devotes an entire chapter to a discussion of Pavlov's ideas of excitation and inhibition and the physiological explanation of mental disease.

The chapter on the organization of psychiatric care is extremely interesting. Russia, with a population of 200,000,000, has only one-half the number of psychiatrists and only one-tenth the number of psychiatric beds as compared with the United States. The Russian setup is so different from that of the United States that it warrants further study.

From the chapter dealing with psychoanalysis and psychotherapy, it appears that psychoanalysis has no place in the Soviet scheme of things. Psychotherapy rests primarily on "common sense" treatment combined with a strong emphasis on work and social activities. The Russians have made a religion out of work, and the psychiatrists use it extensively as a therapeutic agent. The child in the Soviet Union is considered the "flower of the nation," and the care and attention it receives from infancy through school may, in a sense, be regarded by some as prophylactic psychiatry. A chapter is devoted to this subject in which the author points out the close integration of Soviet psychology with pedagogy, based on the thesis that it is possible "to alter character and personality development by training, pedagogy and social influence."

The chapter on treatment refers to the use of such standard methods as sleep treatment with amobarbital sodium, insulin

therapy (the Russians reported on a study of over 100 cases as long ago as 1936), pentylenetetrazole (metrazol®), electroshock, as well as some novel procedures which include the Bogomolets antireticular cytotoxic serum, colloidoclastic shock, autogenous serum and roentgen irradiation treatment.

The reader is urged not to skip the appendix, wherein there is reference to devastating criticism levelled against one of the preeminent Russian psychologists, Rubinstein (the author of "Foundations of General Psychology"), by one of his countrymen for his attempt to effect a synthesis between the conscious and the "freudian unconscious." In the specter of classless existence where the person does not count as a unit but as a part of the whole, the work and the accomplishments of the whole are predominantly important and color the person only in passing. It is not at all unlikely that the psychologist Rubinstein may, in a subsequent edition, alter his views to conform more strongly to marxism and still remain scientifically honest.

The over-all feeling one has, after putting the book aside, is that Soviet psychiatry is a healthy, progressive discipline and that the author has clearly defined the forces responsible for the organic orientation as well as for the total eclipse of psychoanalysis there. It is commendable that Wortis, to provide a real and comprehensive survey of the state of psychiatry in Russia, has gone to the trouble of learning and mastering the language so that he might be able to read and translate the Russian neuropsychiatric literature, which he has approached in a spirit of friendly objectivity. It is unfortunate that the mass hysteria engendered by political friction because of different ideologies encompasses the field of science and the exchange of ideas and that the publishers of this excellent book have thought it expedient to justify its publication. It is regrettable that the times are such that one must say that courage was required to write such a book.

Those who know the language, who have visited the hospitals and talked to some of the leading psychiatrists referred to in the book, can attest that Wortis's presentation is accurate. One must admire the industry of a man who had the patience and zeal to condense the literature of a generation in so prolific a field as neuropsychiatry into so useful a book.

In Defense of Mothers: How to Bring up Children in Spite of the More Zealous Psychologists. By Leo Kanner, M.D., Associate Professor of Psychiatry, The Johns Hopkins University, Baltimore. Second printing. Cloth. $3. Pp. 167, with decorations by Kurt Wiese. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill., 1950.

It was to be expected that a book such as this would make its appearance, in view of the deluge of "scientific" advice and instruction on raising children that has overwhelmed parents, and especially mothers, in the last few years. Perhaps it is even overdue, but in any event it will be welcomed by physicians, who are so often caught in the difficult position of being obliged to admit that psychiatry and psychology have definite places in child development and yet recognize that more harm than good can come from overapplication of these. Kanner's background of experience commands respect, and the freshness and matter-of-factness of his approach are sure to have a reassuring effect on the contemporary mothers whom he addresses in the first chapter. Chief theme of the book is that present day mothers have been forced into a status of such uncertainty by zealous psychologists that they are losing all sense of proportion and ordinary common sense. This is illustrated vividly in numerous chapters, among which may be mentioned "the devil on the wall," "prevention which does not prevent," "mother love and smother love," and "the what's-it called sex education." Superstitions are dealt with effectively, the chronic complainers (most of whom are from the ranks of pampered children, Kanner states) and their motivations are indexed, and habits such as thumbsucking are brought once more within the range of parental understanding. In a chapter on the Great God Unconscious, Kanner "exposes" the Oedipus and Electra complexes developed by Freud and offers equally penetrating comments on the ego. Especially well done is a chapter reassuring parents of children who may deviate to a greater or less degree from physical and mental normals. This volume can be recommended unreservedly by physicians to parents seeking a way out of the maze of modern management of children.

Playgrounds: Their Administration and Operation. Prepared for National Recreation Association by George D. Butler. Second edition. Cloth. $4. Pp. 459. A. S. Barnes and Company, 101 Fifth Ave., New York 3, 1950.

This is a completely rewritten revision of a volume that has been a basic reference for recreation leaders and a textbook for students in the field since the first edition appeared in 1936. Much new information has been added, including a section on the expanded role of the neighborhood playground, descriptions of modern programs and suggestions on how to meet many diversified playground problems. The book is especially noteworthy for its practicality; it reports promising practices that have grown out of actual use in superior programs. Included are materials on selection, training and organization of the staff, use of areas and facilities, development of seasonal activity programs and public relations and finances. The application of principles of good leadership to playground management is emphasized throughout. Physicians who serve on recreation commissions, school boards or other groups responsible for playground development will find the book of real value. Of special interest is the chapter on health and safety, in which are set forth good general principles for accident prevention, emergency care in case of accident or sudden illness, communicable disease control and sanitation and personal hygiene on the playground.

Schistosomiasis in South Central Africa: A Clinico-Pathological Study. By Michael Gelfand, M.D., M.R.C.P. Accepted as the thesis for the Degree of Doctor of Medicine of the University of Cape Town. Cloth. 25s. Pp. 239, with 23 illustrations. Published for The Post-Graduate Press by Juta & Co., Ltd., P. O. Box 30, Cape Town; P. O. Box 1010, Johannesburg, 1950.

This monograph represents a fairly comprehensive review of the clinical aspects, diagnostic features and pathology of schistosomiasis in Africa, due to Schistosoma haematobium and/or S. mansoni. The area involved covers the population of south central Africa and Southern Rhodesia but also includes laborers from Northern Rhodesia, Portuguese Africa and Nyasaland. The monograph is divided into an introductory chapter, which describes the terrain and biologic aspects of schistosomiasis, chapters dealing with incidence figures and detailed chapters dealing with urinary, intestinal and pulmonary schistosomiasis, schistosomiasis of the liver and adnexa, of the central nervous system, of the female genital organs and, finally, a chapter on diagnostic aids.

The author contributes much information, apparently based on his own experience, but not hitherto contained in published material. This is especially true in the chapter dealing with central nervous system schistosomiasis, where he states that involvement of the brain by S. mansoni or S. haematobium occurs with significant frequency. This is contrary to general experience, in that practically all hitherto published material relates schistosomiasis of the brain to S. japonicum. Issue can perhaps be taken with conclusions related to the correlation between cirrhosis and schistosomiasis and the insignificance of pulmonary disease in schistosomiasis. This may be true in Africa. This book is useful particularly to physicians who work in areas where this disease is endemic.

Clinical Orthoptic Procedure: A Reference Book on Clinical Methods of Orthoptics. By William Smith, O. D., Associate Instructor in Optometry and Instructor of Orthoptics and Visual Training Massachusetts School of Optometry, Boston, Massachusetts. Cloth. $8. Pp. 393, with 70 illustrations. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1950.

Orthoptics, the process of training and developing comfortable binocular vision in persons with muscular imbalance and fusional imperfections, has been receiving increased attention in the ophthalmologic world in the past decade. In its broader applications it has been universally accepted, but there remains considerable controversy as to the limits of its practicality and the type of case in which it should be advocated.

This volume deals entirely with the practical clinical use of orthoptics and is of interest to ophthalmologists and orthoptic technicians. The author tends to be overly enthusiastic and is not inclined to be sufficiently critical of the limitations of this form of therapy. Discussion of exact diagnoses is somewhat inadequate, and, while some general material is presented on

the various forms of muscular imbalance, emphasis is placed on description of individual cases, their treatment and cure. There is insufficient comment on the relation of refractive errors and the importance of cycloplegic refractions, as is perhaps to be expected from one with an optometric background. No mention is made of atropine in the cure of accommodative spasm, for which orthoptics is recommended instead. There is a short chapter on reading disabilities, most of which are on a psychological rather than an optical basis. There is a rather complete description of all instruments used in orthoptics, which is instructive to those who have been confused by the various names given by the manufacturers, but little attempt is made to make any comparative evaluation. It is doubtful that any conclusion can be drawn from the report of two cases of myopia "arrested" by orthoptics, as the progress of the myopia might have ceased without any such treatment. In any field as new as orthoptics there are, of course, legitimate reasons for variations in technics and for overenthusiastic interpretations, which will in time seek levels of accepted practice. This book is recommended in spite of its defects to anyone with sufficient background for critical evaluation.

Der Film als Experiment und Heilmethode. Von Dr. Jaromir Lhotský. Mit einem Beitrag: Vergleichspunkte zwischen Film und Traum. Von Univ.-Professor Dr. Otto Pötzl. Paper. 30 Austrian schillings; 10 marks; 10 Swiss francs. Pp. 136, with 21 illustrations. Verlag Wilhelm Maudrich, Spitalgasse 1 B, Wien IX, 1950.

Dr. Lhotský first considers the psychology of the motion picture from the standpoint of the motivations, emphathies, symbolisms and fantasies of both the exhibitor and the observer. This discussion, though it strives to be eclectic, is generally slanted toward the constitutional and phenomenologic approaches currently dominant in continental academic circles. Subsequent chapters deal with the use of films as media in character testing, psychiatric diagnosis and criminologic investigations, with or without concurrent data as to simultaneous variations in respiration, pulse, "psychogalvanic reflexes" and other physiological functions. Special types of films are then discussed, together with the technics appropriate to their use in specific fields of investigation. In a final chapter, Pötzl likens the experience of viewing a two-dimensional film to the tridimensional imagery of dreaming or the hallucinations of schizophrenia, without attempting to explore the deeper dynamic and symbolic appeals of plot, imagery, symbolic communication or character identification.

Unfortunately, the book not only neglects or minimizes many of the modern analytic and projective approaches to the field of cinematography but ignores the work of many American contributors, such as Darrow, Lasswell and others. Nevertheless, it is an interesting and valuable summary of the European literature in an important and promising, but hitherto neglected sphere of research.

A Text-Book of X-Ray Diagnosis by British Authors in Four Volumes. Volume IV. Edited by S. Cochrane Shanks, M.D., F.R.C.P., F.F.R., Director, X-Ray Diagnostic Department, University College Hospital, London, and Peter Kerley, M.D., F.R.C.P., F.F.R., Director, X-Ray Department, Westminster Hospital, London. Second edition. Cloth. $15. Pp. 592, with 553 illustrations. W. B. Saunders Company, 21c. W. Washington Sq., Philadelphia 5; 7 Grape St., Shaftesbury Ave., London, W.C.2, 1950.

Volume 4 is the first published volume of the second edition of this work. The new material that is available in the ever increasing field encompassed by radiology necessitates a new arrangement of the book into four volumes: (1) the head and neck, (2) the chest, (3) the abdomen and (4) bones and joints. Radiologists everywhere have regarded the work of these British authors as one of the best and more definitive publications on the subject. There is little to criticize about this volume except the positive illustrations. It is to be hoped that in subsequent publications the roentgenographic illustrations will be done with negative halftones. This volume contains essentially the same material as was contained in the chapters on bones and joints in the previous edition, with pertinent additions in the form of text and plates. The publishers are to be congratulated on the excellence of the format and the composition of the book.

Meat and Meat Foods: Processing and Preservation from Meat Plant to Consumer. By Lloyd B. Jensen, Ph.D., Chief Bacteriologist, Swift & Co., Chicago. Cloth. $3.75. Pp. 218, with 3 illustrations. The Ronald Press Company, 15 E. 26th St., New York 10, 1949.

This book is one of the Humanizing Science Series, edited by Jaques Cattell, editor of "American Men of Science." Its language is simple and nontechnical. It is intended for laymen. The procedures used in meat processing are described, starting from the farm and proceeding through the packing plant to the consumer's table. This book will be interesting to such persons as meat inspectors, refrigeration engineers, meat dealers and operators of deep freeze lockers and to anyone who wants to know the story of meat production. The aim of using nontechnical language is achieved quite nicely by the author. A person with no basic knowledge of meat processing will find this book very readable and for the most part understandable. There are, of course, a few instances in which the author fails to explain fully the meaning of some terms, but in such cases the reader with some imagination can discern what the author means.

The first few chapters of the book deal with the basic principles and procedures of processing fresh and cured meats and the effects of bacteria on such meat. The chapters following take up in more detail the processing of the various types and varieties of meats. Each chapter contains a paragraph of background material which gives the reader the stimulus to read about the less interesting present methods. The last three chapters deal primarily with problems concerning the safe use of meat. The author has included an extremely interesting appendix of historical notes on the use of meat as a food. This takes the reader back to the cave man and through medieval times up to present day times. A reference bibliography follows this section. The author has done a fine job of removing the heavy material and presents a book which is accurate in detail and interesting.

Surgical Nursing. By Eldridge L. Eliason, A.B., M.D., Sc.D., Consulting Surgeon, Hospital of the University of Pennsylvania, Philadelphia, L. Kraeer Ferguson, A.B., M.D., F.A.C.S., Professor of Surgery, Graduate School of Medicine of the University of Pennsylvania, Philadelphia, and Lillian A. Sholtis, R.N., B.S., M.S., Assistant Professor of Surgical Nursing, Yale University School of Nursing, New Haven, Conn. Ninth edition. Cloth. $4. Pp. 728, with 336 illustrations. J. B. Lippincott Company, 227-231 S. 6th St., Philadelphia 5; Aldine House, 10-13 Bedford St., London, W.C.2; 2083 Guy St., Montreal, 1950.

This completely revised edition is written for the student nurse to prepare her academically and clinically for the many situations with which she will be confronted in her professional life. The authors aim to present enough of the symptomatology with its anatomic and physiological background to enable the nurse to grasp intelligently the principles of treatment of surgical diseases and to appreciate the responsibilities in the care of her patient. In this edition, the social, economic and public health aspects of surgical disease are emphasized as well as the nutritional, physical and mental aspects of each illness. These topics demonstrate to the student the many influencing factors in the total consideration of the patient's welfare, which is the ultimate objective of modern nursing care.

The authors have not sacrificed the details of bedside nursing in their expanded discussions of pertinent sociologic factors. On the contrary, this subject itself has been amplified, and added attention has been given to the nurse's responsibilities in setting into motion the process of rehabilitation during the patient's hospitalization. The chapter on antibiotics and chemotherapy has been brought up to date. New approaches in neurosurgery and thoracic surgery and the specialized nursing care demanded in these fields are subjects that have been added. New material on the subjects of surgery of the heart and its great vessels, surgery of the sympathetic nervous system in the treatment of peripheral vascular disease and hypertension, surgical treatment of hypertrophic pyloric stenosis and ileostomy and colostomy have all been included in this edition. The surgical specialties units have been amplified with new material on corneal transplantation, retinal detachment and enucleation and fenestration.

The arrangement of subject matter is in units according to anatomic systems, although a change of sequence has been made to afford greater adaptability in teaching. Each unit is

followed by a list of references and suggested reading, and more than 300 illustrations are included in the text. The type face and spacing have been changed to promote rapid reading. This book has considerable merit as a textbook for students and as a reference source for graduate nurses. It not only provides a thorough, up-to-date review of surgical nursing but also, through its approach, encourages a progressive attitude toward nurse-patient relations.

Nursing in Prevention and Control of Tuberculosis. By H. W. Hetherington, M.D., M.R.C.P., Chief of Clinic of the Henry Phipps Institute of the University of Pennsylvania, Philadelphia, and Fannie W. Eshleman, R.N., B.S., Supervisor of Public Health Nursing of the Henry Phipps Institute of the University of Pennsylvania, Philadelphia. Third edition. Cloth. $4.50. Pp. 361, with illustrations. G. P. Putnam's Sons, 2 W. 45th St., New York 19, 1950.

In this revised edition the authors attempt to present the subject of tuberculosis in all its aspects in such a manner that it will be readily understood by nurses without special training in the tuberculosis field and at the same time be sufficiently detailed to fill the needs of the more advanced student. Emphasis is on present day concepts of the tuberculosis patient and the health supervision of the patient's family.

Pertinent aspects of diagnosis, treatment, management and rehabilitation are thoroughly discussed. Furthermore, there are chapters dealing with the problems incident to tuberculosis in pregnancy, in infants and in children. Similarly, nursing care technics are presented which will provide effective practical approaches in the care of the patient in the hospital, the dispensary or clinic and in the home. Forcefully stressed are the implications of this disease to the community by the presentation of family case studies illustrating the insidious capacity of the disease for spreading throughout entire family groups. Interested in preventive measures to control this disease are various community agencies, whose functions and interrelated responsibilities with the nursing profession are pointed out.

In summary, this book typifies in its approach to the problems of tuberculosis the thinking which has been responsible for the present notable decline in the incidence of the disease. The value of improved care and public health methods of prevention are emphasized throughout. Inasmuch as this attitude is assuming ever-increasing significance in the present approach to diseases in general, it is particularly important that nurses in their formative stage of professional development be exposed to such a philosophy. For this reason, in addition to its clear comprehensive review of the subject of tuberculosis, this book has merit as a textbook for nurses.

Non-Gonococcal Urethritis Including the Genital Manifestations of Local and Systemic Diseases and Infestations of the Urinary Tract with Protozoa, Metazoa and Fungi. By A. H. Harkness, M.R.C.S., L.R.C.P., Joint Director of the Endell Street Clinic, St. Peter's and St. Paul's Hospitals (Institute of Urology), London. Cloth. $10. Pp. 424, with 167 illustrations. The Williams & Wilkins Company, Mount Royal and Guilford Aves., Baltimore 2, 1950.

This monograph is confined to a rather limited but important field of infection. The description of the various forms of nongonococcal urethritis, together with specific therapy indicated, is most thorough. The illustrations and plates are exceptionally well done and are instructive. It is evident that the author was well qualified to write on this subject and that he had unlimited material to draw from. However, one cannot help wondering whether the differentiation that is made among the various forms of urethritis may be of more academic interest than practical. The monograph should be of value as a reference book to those interested in urethritis. It is much too detailed to serve as a textbook for undergraduates.

Principles of Ophthalmology. By Thomson Henderson, M.D., Senior Surgeon, Nottingham and Midland Eye Infirmary, Nottingham. Cloth. $4.50. Pp. 230, with 63 illustrations. Grune & Stratton, Inc., 381 Fourth Ave., New York 16, 1950.

The title of this book is misleading. It is a series of essays by an original thinker whose conclusions often run counter to what is generally accepted as fact in ophthalmic physiology and pathology. There are chapters on the angle of the anterior chamber, the intraocular pressure and glaucoma, the mechanism of accommodation and several other ophthalmologic subjects. The author's conclusions are drawn largely from comparative anatomy of the eyes of mammals. The book is stimulating but not to be read without a critical attitude.

Cerebral Palsy. By John F. Pohl, M.D., Orthopedic Surgeon, Michael Dowling School for Crippled Children, Minneapolis. Cloth. $5. Pp. 224, with 131 illustrations. Bruce Publishing Company, 2642 University Ave., St. Paul 4, Minn., 1950.

Until the last 10 years the patient with cerebral palsy was indeed the forgotten child. As an outgrowth of the interest and work for crippled children in general, of the combined federal and state programs for the care of the physically handicapped child and the tremendously expanded work of the National Society for Crippled Children and Adults, a patient with cerebral palsy now seems to be well on the way to becoming a favored child. Facilities and programs for the care of children with cerebral palsy are being added each year. There is the United Cerebral Palsy Associations, an organization now engaged in raising funds for hospitals and schools which will be devoted exclusively to the care and education of crippled children of this special category.

Pohl attempts to explain the etiology and pathology of cerebral palsy. The simplest possible language is used to describe the different types of this disease. The plan of treatment described by Dr. Pohl is confined for the most part to education of the child through supervised activities in which he must learn how to help himself. The need for the child to learn relaxation along with neuromuscular training is discussed. The modalities which are used as part of the program, including physical therapy, occupational therapy and speech training are duly emphasized. Surgical procedures are not discussed in detail. While there is nothing that might be considered either new or revolutionary, the book is clearly written and easy to understand. It should be of value to those who wish to become teachers in the field of cerebral palsy and to parents of children who are crippled by this disease.

Medical Parasitology for Medical Students and Practicing Physicians. By William G. Sawitz, M.D., Associate Professor of Parasitology, Associate in Medicine, The Jefferson Medical College of Philadelphia. Cloth. $4.25. Pp. 296, with 90 illustrations. The Blakiston Company (Division of Doubleday & Company, Inc.), 1012 Walnut St., Philadelphia 5, 1950.

Here is a useful manual for the guidance of both laboratory and clinical students of parasitology. It presents the subject from the medical viewpoint without omitting essential zoological information and concepts. Not designed or intended to replace textbooks on the subject, it is nevertheless complete from the standpoint of essentials for the training of parasitologists. The organization, definitions and classification of various subdivisions of the subject are unusually clear and to the point. The book includes essential illustrations, most of which are excellent, though occasionally they are too diagrammatic. More color could have been employed to illustrate characteristic staining reactions, as in the case of malarial parasites. The chapter on treatment is complete to the point of inclusion of various pesticides and repellents as well as modern agents for the therapy of insect bites and internal parasites. Not the least important features are the vocabulary of technical terms and a carefully prepared index.

We Pass This Way. By Charles A. Cooper. Cloth. $3.50. Pp. 183. Exposition Press, 251 Fourth Ave., New York 10, 1950.

This is a novel written by a physician who practices in a small town in northern Michigan. The action of the story takes place in a copper mining village in the section where the author lives. It demonstrates the fact that to be a good physician one must be a keen observer of human nature, and Dr. Cooper has shown in this story that he has this quality. He has reduced to the printed page the thoughts and actions of many characters from all walks of life. These people for the most part lead drab, circumscribed lives and only occasionally break through the drabness. The author states in the first chapter, "The land don't change much. Men pass this way, and leave their marks, but a few years, an' you can't hardly tell there was a thrivin' community here. Mighty near never left a trace." The story makes interesting reading.

QUERIES AND MINOR NOTES

The answers here published have been prepared by competent authorities. They do not, however, represent the opinions of any official bodies unless specifically stated in the reply. Anonymous communications and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted on request.

VOCAL TRAINING

To the Editor:—Is it possible to increase the potency of a speaker's or a singer's voice? To obtain a long emission without being tired? To extend the gamut tonality in which range a voice may develop? To free a timbre from unpleasant harmonics? Which scientific methods are adequate to obtain these results? Is there any treatise dealing with these problems and with the hygiene and care of the voice for the use of speakers and singers? Is there any specialist in phonology in an established school for declamation, singing or similar arts whom it would be possible to consult in specific cases?

M.D., Havana.

ANSWER.—It is possible to increase the potency of a speaker's or a singer's voice, obtain a long emission or speak continuously without fatigue and to free the timbre from unpleasant harmonics. The pitch range of a voice may be extended but may involve great harm to the vocal cords in most persons. Forcing the voice in any manner is harmful. Many vocal difficulties are brought about by irritation from misuse of the voice and often result directly from vocal instruction by vocal teachers who are not scientifically trained. Scientific methods have been developed in which ease of phonation, natural pitch range, diaphragmatic breath control and avoidance of glottal attacks are of the most importance. A recommended book dealing with some of these problems is "Training the Speaking Voice," by Virgil Anderson (New York, Oxford University Press, 1942). No adequate book has been published dealing with these problems, since it is a subject which only in recent years has been placed on a scientific basis.

Scientifically trained phonologists are few. They are persons with university degrees in speech therapy who have specialized in voice. Some of the certified members of the American Speech and Hearing Association (Speech Clinic, Wayne University, Detroit, Mich.) are qualified to do this work. The departments in the United States which have specialized in voice are the School of Speech, Northwestern University and Temple University Medical School. Work of this type should be conducted only in consultation with laryngologists.

LEAD AND ZINC INDUSTRIAL HYGIENE

To the Editor:—Please furnish me with data concerning (1) an easily performed, rapid test for lead in urine and for zinc, (2) a method of preparing the copper sulfate solutions for the falling drop method of determining specific gravity of blood, (3) toxicity of zinc, symptoms and treatment and (4) a short bibliography of material dealing with lead and zinc industrial hygiene.

M.D., California.

ANSWER.—1. There is no "easily performed, rapid test for lead in urine." All of several available quantitative tests are exacting and require skill above the usual clinical laboratory level. The details of any one method are too extensive to permit presentation here, but full data may be obtained in the book by H. B. Elkins (The Chemistry of Industrial Toxicology, New York, Wiley and Sons, Inc., 1950) or that by M. B. Jacobs (Analytical Chemistry of Industrial Poisons, Hazards, and Solvents, New York, Interscience Publishers, 1949, vol. 1). The procedures required for zinc determinations similarly may be found in the publications mentioned.

2. The exact strength of the several solutions of copper sulfate as applied in the falling drop method of specific gravity of blood measurement is critical and calls for precise standardization. On this account it is somewhat impractical to prepare these test solutions in small laboratories. Prepared materials are supplied by Anachemia, Ltd., through any good laboratory supply firm. The required solutions and procedures are discussed in an article by Atchley and co-workers (Copper Sulfate Method for Measuring Specific Gravities of Whole Blood and Plasma, *J. Lab. & Clin. Med.* **30**:830, 1945) and in one by Muirhead and co-workers (Practical Observations on the Copper Sulfate Method for Determining the Specific Gravities of Whole Blood and Serum, *Surg. Gynec. & Obst.* **82**:405, 1946).

3. By some definitions zinc is not a toxic agent, but some of its salts are, such as the chloride. Freshly produced zinc oxide in the form of fume is one of the several metals that may lead to metal fume fever, better known as zinc chills or zinc ague. This acute disease (there is no known chronic form) arises oftener in foundries where zinc is a constituent of the metal poured, such as brass foundries. Several hours after exposure, the victim undergoes pronounced chilling resembling a malarial chill and complains of pronounced and unquenchable thirst; there may be present an elevated temperature. All this may be followed in a few hours by pronounced fatigue, malaise and distaste for food. Ordinarily no time is lost from work. Day by day these episodes may recur in varying severity. Real treatment is elimination of exposure. Otherwise the treatment is symptomatic and treatment may not be required.

4. The following books furnish both pertinent data and extensive bibliographies: "Lead Poisoning," by A. Cantarow and M. Trumper (Baltimore, Williams & Wilkins Company, 1944) and "Industrial Hygiene and Toxicology," by F. A. Patty (New York, Interscience Publishers, 1949, vol. 2).

FEVER OF UNDETERMINED ORIGIN

To the Editor:—Many patients with "fever of undetermined origin" receive the usual laboratory examinations, get well and leave the hospital without a diagnosis. I feel that more exhaustive studies can be done in these patients. Please discuss the differential diagnosis in the following hypothetical case and name the laboratories where the more unusual types of studies can be done: A 30 year old, previously healthy white man enters the hospital because of malaise and fever. His temperature over a 14 day period is normal. Repeated roentgenograms of the chest, urinalysis and blood cultures are not revealing. Stool cultures are negative. Results of serologic studies and blood agglutinations for brucellosis, Salmonella, typhoid, paratyphoid, tularemia and heterophil antibodies are negative. The blood cell count is normal.

Richard R. Grayson, M.D., Lubbock, Texas.

ANSWER.—In the foregoing case, of an acute febrile illness occurring in a previously healthy man with quick return of the temperature to normal, one can rule out certain well known causes of "fever of undetermined origin," including carcinoma, lymphoblastoma, leukemia and probably bacterial infections such as tuberculosis. The commonest cause of this type of illness is a virus. To define the virus responsible for the illness is difficult. There are a number of viruses causing respiratory disease which may cause an atypical clinical picture as described. The diagnosis of viral diseases is time consuming and can be carried out only by special laboratories. The laboratories of many state boards of health, as well as the Communicable Disease Center of the United States Public Health at Atlanta, Ga., are prepared to carry out these studies. In general, two methods are utilized for identifying the viral disease. One is by isolation of the virus from the tissues, body fluids or secretions by appropriate procedures. The other method is by ascertainment of the presence of antibodies in the blood. For the latter purpose, the serum would be collected under sterile conditions during acute and convalescent stages of the illness. Further discussion of this subject is included in "Routine Laboratory Diagnosis of Virus and Rickettsial Diseases," by Albert Milzer (*J. A. M. A.* **143**: 219 [May 20] 1950.)

ABSCESSED TEETH

To the Editor:—In acute dental alveolar abscess with swollen jaw and fever, what is the medical management prior to extraction of the abscessed tooth? What measures are recommended after extraction of a tooth which results in similar symptoms? From time to time the general practitioner is asked to treat this condition.

Irving I. Crouse, M.D., Buffalo.

ANSWER.—Treatment of acute infections about the jaws does not differ basically from treatment of similar infections elsewhere. The major consideration is the proximity of the infected tooth to the bone and the concomitant bacteremia. The patient should be adequately prepared with antibiotic therapy prior to the extraction. Roentgenographic examination and a complete blood cell count are also desirable. Postoperative treatment should include the use of a saline mouth wash or irrigation. Extraoral heat and surgical drainage and hospitalization should be considered. Antibiotic therapy, diet, fluid intake and analgesics are important aspects of medical management. Further information may be obtained in standard oral surgery textbooks.

INFANTILE GENITALIA

To the Editor:—A 10 year old boy has a penis less than 2 cm. in length; the scrotum is small, and the testes are peanut size. The organs have not shown any development from infancy. He is sensitive about it, as the boys at school tease him. He is a little over normal height and weight, and in the past few months he has become a bit chubby. There may be a slight tendency toward girdle obesity. He was delivered by cesarean section and has always been of "frail" health. He seems bright in his school work. Would hormone therapy be indicated? Is testosterone or pituitary gonadotropic hormone recommended and in what dosage?

Owen Wheeler, M.D., Portland, Ore.

This inquiry was referred to two authorities, whose respective replies follow.—Ed.

Answer.—One frequently sees boys, prior to adolescence, in whom the genital organs may be described as infantile. It is remarkable how often this defect is remedied by adolescence. It would be unwise to try hormone therapy at this time, because when it has been employed prior to adolescence the results have been anything but satisfactory; in some cases such treatment has been injurious. It would be well to wait until after adolescence and employ these therapeutic agents only in case the genital organs remain abnormal. The patient should be informed of this fact and told not to despair of eventual normal manhood.

Answer.—This boy is nearing the age at which normal pubertal development usually occurs. One probably would be wise to wait until he is 12 or 13 before considering hormone therapy. The fact that the testes are in the scrotum suggests that, if he does not develop sexually, the diagnosis would be secondary hypogonadism. This means that there is insufficient stimulation of the gonads by the pituitary. However, the gonads may prove to be refractory to pituitary stimulation. One should try chorionic gonadotropins in this case first. This substance is mostly luteinizing hormone, producing its effect on the interstitial cells of the testis, causing the testis to produce androgen. Suggested dosage is 500 units of chorionic gonadotropin twice a week for two or three months. If no effect is observed, then androgens should be given in small doses to permit determination of a maintenance dose, such as 10 mg. of methyl testosterone orally once a day for a month or six weeks, the dosage being varied depending on response. This is substitution therapy and would hardly be expected to produce a normal set of gonads; it would merely fill the body needs for androgens.

PARKINSONISM

To the Editor:—Please discuss treatment of idiopathic parkinsonism in the light of Sigwald's report of benefit from 10-(2-diethylaminopropyl) phenothiazine hydrochloride (RP 3356), abstracted in *The Journal* March 18, 1950 (page 853). P. W. Van Metre, M.D., Rockwell City, Iowa.

Answer.—Both RP 2987 (diparcol) and RP 3356 (parsidol) have been reported on in the French literature by Sigwald. An elaborate technic for their clinical use was worked out by him, the dose being arranged throughout the day so that the side effects were minimal. When they did appear, Sigwald counteracted them with specific drugs, such as *d*-amphetamine sulfate for drowsiness. In these circumstances, the results were impressive. Other workers are less enthusiastic, and in one series only one third of the patients receiving diparcol showed improvement and only one half receiving parsidol were benefited. It is possible that the discrepancies between these reports are due to the fact that the American investigators did not carry out in detail the technic suggested by Sigwald. Both drugs are still under investigation and are not acceptable at the present time as drugs that should be widely used for parkinsonism.

OIL FORCED INTO FINGER

To the Editor:—A man punctured his finger with a drill. The drill is hollow, and a stream of oil constantly flows through it under pressure. The finger was immediately tense and swollen, and the man had great pain. It was incised in the flexor surface to the tendons and allowed to remain open. The finger gradually healed, but it has remained nearly double its normal size and is tense and indurated. This swelling extends down into the hand along the second metacarpal. It is now almost five months since the accident, and the condition seems to be more or less stationary. There is practically no useful function in this finger. The man heard that injections of ether have been used for conditions similar to his. Has such treatment been successfully used? W. H. Cole, M.D., Elizabeth, N. J.

Answer.—Oil forced into the soft tissues causes severe and extensive fibrous tissue reaction. Since five months have elapsed since the accident and there is no useful function of the finger, the only practical solution of the problem is amputation. If this is carried out, every effort should be made to excise the scar tissue about the metacarpal as completely as possible. Injections of ether would add further insult to the injury which has already been sustained.

THE SWIMMING HOLE AND POLIOMYELITIS

To the Editor:—The local health board has posted a small stream against swimming for the past two years, believing it to be a possible source of poliomyelitis for the following reasons: Once weekly the town garbage is dumped and burned with gasoline in an area 150 yards from the stream; about 1,000 yards downstream a small dam forms a popular swimming hole. The posting of this latter spot has aroused a certain amount of community ire. Are we justified in supposing that poliomyelitis can be a menace here? N. E. Patrick, M.D., Factoryville, Pa.

Answer.—It does not seem likely that the garbage dump to which you have referred is a potential source of poliomyelitis virus, especially since it is regularly disposed of by burning. In addition to this, the virus of poliomyelitis has never been recovered from swimming pools; in the one or two recorded instances where it has been isolated from moving streams the opportunities for contamination were much more obvious than they appear to be in this instance. It may be that the local health officer has found the stream to be otherwise polluted, and, therefore, closure of the swimming hole might be justified but not primarily because of the danger of poliomyelitis.

PYORRHEA AND RETINAL HEMORRHAGES

To the Editor:—A 27 year old woman decided some months ago to have her teeth removed because of pyorrhea. She has been a diabetic since the age of 11 years. She was being treated by another physician and was under good control for diabetes; she was on a balanced diabetic diet and took 60 units of protamine zinc insulin a day. The dentist then extracted all her lower teeth; a short time after this she had massive hemorrhages of the right eye. No relation between the extractions and hemorrhage being evident, extraction of the upper teeth was then begun, with removal of four or five at a time. Retinal hemorrhages then began to develop in the left eye. Is there any relation between the removal of such teeth and retinal hemorrhages in diabetics? Once retinal hemorrhages occur in these patients is there any cure for them? What is the prognosis?

Abraham A. Kaufman, M.D., Binghampton, N. Y.

Answer.—This interesting problem cannot be answered with certainty. It is also unusual. There is nothing which would relate the massive retinal hemorrhages to the extraction of teeth. They could be coincidental. They could be related to the surgical procedures if a general anesthetic was used, though anesthesia is not mentioned in this case. The safest procedure to be used for extractions should consist of a constantly good control of the diabetes and the removal of a small number of teeth with local nerve block.

Therapy for the retinal hemorrhages should also consist of good management of the diabetes. Hemorrhages are concomitants of the disease and may be expected. There is always some improvement of the acute phase, with absorption of the blood in the retina, but a scar and impairment of vision often results. Attempts to treat the hemorrhage with vitamin P (rutin) have not had constant success. The hemorrhagic condition is not related to the vitamin C intake. The prognosis is not entirely serious, since the appearance is not always progressive and may subside. If retinitis proliferans accompanies the event, the prognosis is poor.

SUBACUTE COMBINED DEGENERATION OF SPINAL CORD

To the Editor:—My condition has been diagnosed as lateral posterior sclerosis of the spinal cord. What is the cause, prognosis and accepted treatment for this condition? Please give the differential diagnosis between lateral posterior sclerosis and multiple sclerosis. M.D., Missouri.

Answer.—Posterolateral sclerosis of the spinal cord is perhaps better termed and is usually referred to as subacute combined degeneration of the spinal cord. The disease syndrome has manifestations of lesions in the spinal cord and peripheral nerves. It is usually associated with pernicious anemia but infrequently is also seen in secondary anemia and severe dietary inadequacies. The etiology has not yet been adequately described. Some authors have held that subacute combined degeneration was the result of neuroanemia. Offered in support of this contention was the fact that in most cases the thoracic portion of the spinal canal, which has a relatively poor blood supply, was the region most seriously involved. It is more likely that the disease results from effects of nutritional deficiencies. It has been described as occurring in pellagra, sprue, carcinoma of the stomach and hepatic disease. If recognized early in the course and before spinal cord changes are severe, neurological manifestations are frequently reversible. Treatment must be directed at the underlying or associated disease. In the treatment of pernicious anemia, the administration of potent liver extracts and/or vitamin B_{12} will protect against the development or effect remission of subacute combined degeneration of the spinal cord. Pteroylglutamic acid is not effective in this regard. The provision of vitamin B complex as a part of the therapeutic regimen may control symptoms of peripheral neuritis, which frequently accompanies this disease.

Subacute combined degeneration of the spinal cord is characterized by sensations of numbness and tingling of the hands and feet and by increasing paralysis of the legs and hands. These symptoms may also be associated with multiple sclerosis, which may have a wide variety of neurological manifestations and may simulate many other diseases of the central nervous system. Multiple sclerosis chiefly affects persons in the age group of 20 to 35 years, whereas subacute combined degeneration of the cord occurs more commonly after middle life. The latter disease is progressive, presents no ocular symptoms and produces loss of sphincter control late in its course. Deep reflexes are usually absent. In contrast, multiple sclerosis is remittent in its course, is associated with transient diplopia, blindness and blurring of vision and affects sphincters in its early stages. Deep reflexes are rarely absent in this disease. The demonstration of macrocytic anemia and gastric achlorhydria is evidence in favor of the diagnosis of subacute combined degeneration of the cord, since this is so commonly associated with pernicious anemia.

ALCOHOL FOR ANGINA PECTORIS

To the Editor:—I have a moderate degree of coronary sclerosis and a slight disturbance of the peripheral circulation. I have been advised by competent physicians to use a moderate amount of whiskey. I have been using six year old whiskies, bonded or straight bourbon. However, I have been advised that blended whiskey, made of whiskey and neutral spirits, is just as good for me. Is this correct? M.D., Ohio.

ANSWER.—Alcohol in moderate amounts has been used for the relief of angina pectoris ever since it was first recommended by Heberden. Alcohol is of no value in the management of the acute attack, inasmuch as the attack usually subsides spontaneously, before alcohol could have an effect. For this reason the nitrites are of more value in aborting the acute attack. Many physicians suggest that alcohol be used in coronary artery disease, because of its vasodilating effects and because of its analgesic and sedative actions. These effects are due to the alcohol itself and not to the extractives or aromatics. Aging of alcohol acts to change the fusel oils and aromatic compounds, resulting in the removal of irritants which are present in some of the neutral spirits, and provides special aromas, depending on the method of aging. These latter are of gustatory value only. Blended whiskies are just as efficacious in producing the desired effects in angina pectoris as are the bonded varieties. A word of caution should be sounded against the danger of habituation.

HEMIHYPERTROPHY

To the Editor:—A girl born Sept. 12, 1946, after an uneventful delivery, weighed 9 pounds 7 ounces (4,281 Gm.) at birth. At 2 weeks of age she seemed to have choking spells with slight cyanosis, followed by a minute or two of limpness. There were no convulsions. The child had two spells, and in one the lips were decidedly cyanosed and the face very pale. No irregularity of the heart was noted. The temperature, urine and bowel movements were normal. The thymus appeared decidedly enlarged on fluoroscopic examination. In the third week of life the mother noticed that the left cheek, the left arm, the left side of the body and the entire left lower extremity were larger than the right. Roentgenograms of the long bones on both sides showed no difference in size between the two. A pediatrician diagnosed hemihypertrophy due to an ovulation-fertility phenomenon, in that the pregnancy should have been a twin pregnancy, so that the end-product shows a twin effect. What will this girl look like as an adult? Would plastic surgery result in a closer to normal appearance? Could some abnormality of the great vessels or the heart produce this picture? M.D., Minnesota.

ANSWER.—Hemihypertrophy is a rare congenital abnormality, the cause of which is unknown. In not a few instances it has been associated with retardation in mental development.

It is not possible to predict the future appearance of a given child who exhibits the condition. However, it is stated that the hemihypertrophy may partially or entirely disappear, at least so far as it would be noticeable to other persons. There is no indication for the employment of any plastic operation, especially since improvement can be expected with advancing age.

TINNITUS AURIUM

To the Editor:—For best results in tinnitus aurium, how frequently may vitamin A (ampuls of 1 cc., 50,000 units) be injected? M.D., Pennsylvania.

ANSWER.—The generally accepted treatment with vitamin A for tinnitus consists of giving 1 cc. (50,000 units) intramuscularly twice a week. A six week period of treatment is usually sufficient to indicate effectiveness. There is, however, no well controlled clinical study to indicate the effectiveness of vitamin A in the treatment of tinnitus.

ANTIBIOTICS BY MOUTH AND VITAMIN ABSORPTION

To the Editor:—A well informed physiologist made the statement that all patients subjected to oral treatment with chloramphenicol, aureomycin or terramycin should receive concomitant parenteral or intravenous supportive vitamin therapy (particularly B complex and C), because these antibiotics drastically retard or wholly inhibit absorption of vitamins from food or from orally administered vitamin concentrates. Is this true? M.D., Texas.

To the Editor:—Reactions to oral administration of aureomycin have been occurring with disturbing frequency in our locality. They consist of stomatitis with fissuring of the angles of the mouth and, frequent, vaginitis and inflammation of the rectum, similar to reactions seen in some patients given penicillin orally. The patient complains of a burning sensation from mouth to anus and sometimes diarrhea. I would appreciate any recommendations you can offer. Donald E. Minch, M.D., Lakeview, Ohio.

ANSWER.—Satisfactory evidence is lacking that any of the newer antibiotics either retard or inhibit the absorption of vitamins from ingested foods or from capsules and tablets of such vitamins administered by the oral route. Disturbances in the function of the colon do occur when aureomycin, chloramphenicol or terramycin are given in appreciable doses. For example, bilirubin appears in the stool. This occurs because these antibiotics suppress the growth of or actually kill susceptible, normally occurring bacteria in the colon and in other places, such as the mouth and pharynx. When this occurs, organisms which are resistant to the bacteriostatic or bactericidal effects of these antibiotics replace the normal bacterial flora. Naturally, the suppression of normally occurring bacteria, especially in the colon, brings about pronounced changes in bacterial metabolism. This accounts for the disturbances so frequently noted in the stools and the elimination habits of patients who are receiving these newer antibiotics. When aureomycin, chloramphenicol or terramycin are being administered, lesions may occur on one or more of the mucous surfaces of the body. It has been established that in certain patients these lesions are produced by, or become infected with, yeastlike organisms, of which Monilia are the commonest. Also, it seems that lesions of the mucous membranes may sometimes be due to vitamin B complex deficiencies when the newer antibiotics are being administered. Therefore, when mucous membrane lesions make their appearance, one should first establish whether these lesions are due to an infection with Monilia or to a vitamin deficiency. When this determination has been made, proper therapy may be instituted.

Evidence seems to be accumulating that it is logical to administer by mouth the recommended requirements of vitamins (especially those of the B complex) as a supplement to dietary vitamins, to all patients who are receiving 2 Gm. or more of aureomycin, chloramphenicol or terramycin per day, for a period of five or more days. Patients receiving these doses of these antibiotics frequently do not have a normal vitamin intake from food because they are nauseated. There is little if any evidence that vitamins should be administered parenterally or intravenously to patients receiving these antibiotics, unless they are very ill or unless the physician feels that the patient's vitamin intake had been deficient prior to treatment with any of these newer antibiotics.

COMBINED INJECTIONS

To the Editor:—Can tetanus toxoid and 400,000 units of aqueous penicillin (procaine penicillin G and penicillin G, crystalline potassium) be administered together in a syringe through the same needle puncture without any harm to the action of each? Can tetanus antitoxin, following the skin test, be combined with 400,000 units of penicillin for injection? Frederick H. Bowen, M.D., Jacksonville, Fla.

ANSWER.—The combination of penicillin with either tetanus toxoid or tetanus antitoxin should cause no harm to the action of any of the ingredients. However, if the contents remain long in the syringe before expulsion, there may be blocking of the needle.

LOW SODIUM DIET

To the Editor:—A patient has raised the question as to whether a mold inhibitor, sodium propionate, sold under the trade name of mycoban, would be sufficient to affect a low sodium diet. M.D., Missouri.

ANSWER.—It is necessary that one be on guard against concealed sources of sodium in the diet. An example, which is often unsuspected, is the custom of many restaurants of adding salt to their coffee. Inquiry of several large baking companies elicits the information that most of them do not use mold inhibitors. Calcium propionate is used in some baked articles. Sodium propionate, when employed, is in the proportion of 2 to 4 ounces to 100 pounds of flour, or about 160 pounds of bread. The amount, therefore, is too small to be significant in a low sodium diet for ordinary practical purposes. It can be significant only under experimental or exceptionally severe conditions.

STERILIZATION OF LANCETS

To the Editor:—Since publication of the article by Dr. Walter Ward and me in THE JOURNAL (June 17, 1950) I have received inquiries concerning the proper sterilization of a lancet used for finger or ear puncture when doing blood cell counts, so as to avoid the possibility of transmitting a virus infection. Many physicians do not have autoclaves or ovens in their offices, and the question of a substitute arises. Some suggest having enough blades on hand so they can be put in a sterilizing solution overnight. Would this be better than using boiling water for 20 to 30 minutes?

Clifford Kuh, M.D., Oakland, Calif.

ANSWER.—Chemical agents cannot be relied on to destroy the virus of homologous serum jaundice. In view of the availability of electric hot plates, pressure cookers and miniature, electrically operated autoclaves, there is no excuse for one's not exercising adequate procedures for the disinfection of instruments by heat. Some clinical laboratories are guilty of careless handling of syringes, needles and lancets utilized for the collection of blood specimens.

Contaminated instruments may be placed in solutions of chemical disinfectants prior to heat treatment. A preliminary heat treatment in boiling water for 15 minutes will minimize the danger of accidental infection. Organic material such as blood and pus will coagulate during the preliminary heating; the larger particles can be removed by mechanical cleansing, and the smaller particles will dissolve in hydrogen peroxide or dilute ammonia water. Final disinfection by heat can be effected by submersion in boiling water for at least 15 minutes, the timed interval to begin after the water begins to boil.

Lancets utilized for collection of micro blood specimens from the finger or ear lobe should be solid and without holes or sleeves. A clean, sterile instrument should be utilized for each subject. Lancets may be subjected to the procedure outlined above, or terminal sterilization may be effected in the flame of a Bunsen burner or alcohol lamp.

Syringe technic in preventing serum jaundice is described in Queries and Minor Notes, page 579, June 11, 1949.

TINY VENULES ON THIGHS

To the Editor:—Several white women, aged 20 to 30, have large numbers of superficial telangiectases on their thighs. Please discuss etiology and treatment.

Richard R. Grayson, M.D., Lubbock, Texas.

ANSWER.—Often such vessels are composed of tiny venules rather than telangiectases. They are of no importance other than that they constitute a cosmetic defect. They may be destroyed by electrolysis, by punctate electrocautery or by careful injection of a drop of a sclerosing agent, but the results obtained are in many instances not satisfactory.

POSTURAL HYPOTENSION

To the Editor:—A patient apparently has postural hypotension. She is 65 years old and until six months ago had had essential hypertension (with a systolic pressure said to be around 220) for years. Six months ago she had a coronary occlusion, for which she was hospitalized for two weeks and in bed at home for two weeks. About two weeks later she had an illness, diagnosed as a virus infection. Then she complained of weakness and dizziness on walking; she has remained in bed since, getting out only to go to the toilet or for occasional meals. The patient is described as somewhat given to complaining, always busy but of very limited interests. Her husband has been dead for 10 years. About a year ago, a niece was killed in an automobile accident. This patient complains of burning and pains in the palms and soles, fulness after eating and lack of appetite. She has attacks of anxiety and once vomited. Another time she complained of the room turning about her if she closed her eyes. Reassurance seemed to relieve these episodes. The only positive observations after a week of hospitalization were a duodenal diverticulum (second portion) and postural hypotension. At rest, her blood pressure is usually 170/100. On standing or walking for a minute it drops to 120-130/80-90. These observations were repeated many times. Ephedrine sulfate, amphetamine sulfate, a visammin preparation by mouth and desoxycorticosterone had no apparent effect on the postural hypotension. A neurologist could find no organic lesion and felt that many of the patient's symptoms could be explained on a psychoneurotic basis; nevertheless, he was unwilling to let that be the entire diagnosis and suggested the patient be watched for further development.

M.D., New York.

ANSWER.—One can only guess the cause of the hypotension in this patient, the most likely guess being lack of tonic response of the visceral blood vessels due to the antecedent virus infection. Possibly the myocardium has been sufficiently weakened as the result of infarction so that it does not respond adequately. This seems unlikely. Some disturbance of the sympathetic nervous system is still another possibility, which one could test by blocking the ganglions with tetraethylammonium chloride to determine whether blockage gives a less than normal vascular response when the patient assumes the erect posture. Since the mechanism is unknown, one can only recommend empirical measures: The patient should (1) sleep in a bed raised at the head, (2) have a corset designed to assure greater return of blood from the abdominal area to the heart, (3) exercise to strengthen the muscles of the abdominal wall, (4) take moderate outdoor exercise and (5) discontinue taking drugs.

OSTEITIS DEFORMANS

To the Editor:—Please give the course of treatment for Paget's disease (osteitis deformans) in a 53 year old man? Is testosterone of any value?

William Kershaw, M.D., Queens Village, L. I., N. Y.

ANSWER.—The etiology of Paget's disease is unknown, and there is no known effective treatment. If, as in some cases, there is pain associated with the condition, roentgen therapy may be of palliative value. Salicylates may help in the same manner. There is no proof that testosterone is of value. There are no published reports of adequately controlled series of patients treated with this hormone.

NOCTURNAL CRAMPS AND VOMITING OF PREGNANCY

To the Editor:—In the answer to the question on "Nocturnal Cramps and Vomiting of Pregnancy" in the July 8 issue, I wish to bring the following observations to your attention: The incidence of nocturnal leg cramps among our obstetric patients has been severe enough to warrant careful study as to the etiology. Our observations do not substantiate low calcium intake as being of etiological importance. Our patients are routinely maintained on supplemental calcium gluconate; yet 10 per cent complain of nocturnal leg cramps. Eliminating those patients with obvious varicose veins, we have been unable to establish any definite cause for this bothersome complaint. Our patients have experienced satisfactory and rapid relief from nightly administration of 50 mg. of diphenhydramine (benadryl®) hydrochloride. With this regimen, all symptoms usually vanish within five days. Recurrences are treated with spasmodic doses of diphenhydramine hydrochloride as indicated.

William G. Caldwell, Toluca Lake, Burbank, Calif.

To the Editor:—Several times in the past few years I have noticed questions regarding nocturnal leg cramps in Queries and Minor Notes. I have not seen, however, mention made of the most effective treatment for this condition, which consists of 5 grains (0.30 Gm.) of quinine sulfate at bedtime. This dose should be continued for five to seven days, after which in a majority of cases the condition will be relieved. Should it recur later, the medication should be repeated. The mechanism by which quinine helps probably has to do with its effect on muscle irritability. The cramps themselves are most likely to occur after excessive exercise, excessive perspiration with ingestion of large quantities of water or severe vomiting or diarrhea. They apparently are closely allied with chloride metabolism. I cannot give you the original source of this use of quinine. It was put in the literature several years ago by Dr. Foster Kennedy of New York. It had been noted as a by-product during the course of an inquiry into the treatment of spastic paralysis.

Robert J. Needles, M.D., St. Petersburg, Fla.

The above comments were referred to the consultant who answered the original inquiry. His additional comment follows. —ED.

I did not attempt to go into all the causes of leg cramps in my reply. I made no suggestion that it was due to low calcium intake but merely local calcium deficiency, that is, in the muscle. Another point is that, in spite of a deficient intake of calcium, the blood calcium levels usually remain normal. I have not used diphenhydramine hydrochloride in this condition, but I repeat that adding 30 drops of oleum percomorphum (natural) daily will almost without exception stop the leg cramps in about three to five days. If one reviews muscle physiology, it appears that these cramps are in some way related to carbon dioxide, lactic acid and local calcium metabolism. Track men frequently experience these cramps when overextending themselves.

ANXIETY OR CHOREA

To the Editor:—With reference to the query entitled "Anxiety or Chorea" in *The Journal* of August 12 (page 1360), I should like to call attention to the work done by my associates and me, which suggests that a large percentage of the cases of Sydenham's chorea are not related to rheumatic fever (Kagan, B. M., and Mirman, B.: Sydenham's Chorea: A Syndrome for Differential Diagnosis, *J. Pediat.* 31: 322 [Sept.] 1947. Kagan, B. M.; Rosner, D., and Rosenblum, P.: Chorea [Sydenham's]: A Study of 58 Additional Cases, *Am. J. Dis. Child.* 78:306 [Sept.] 1949).

The fact that physical, roentgen and laboratory examinations disclosed no abnormalities except for evidences of incoordination, nervousness, grimacing and twitching does not exclude a diagnosis of Sydenham's chorea. If this was the first episode of chorea in this child and if the results of all the examinations are negative as reported and the erythrocyte sedimentation rate was determined within the first three weeks of the onset of the initial episode, it would appear most unlikely that this child has rheumatic fever. However, there is nothing at this time to help rule out a diagnosis of Sydenham's chorea. The association of a state of anxiety with Sydenham's chorea and the absence of any evidence of rheumatic fever, either during the episode or subsequently, are common.

B. M. Kagan, M.D., Chicago.